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ABSTRACT

The 18 papers presented at this conference address national information policies, information for industry, and electronic publishing. The titles of the papers are as follows: (1) "Industrial Information Policies of Developing Countries" (keynote address, Sung Jin Choi); (2) "National Information Policy. Current Trends and Issues--an Australian Experience" (Lawrence Tam and Ian Dickson); (3) "An Information Policy for Hong Kong" (Barry Burton); (4) "A National Information Policy for Indonesia" (B. Sudarsono); (5) "The National Information Policy in Japan" (Nagao Hagiya); (6) "Formulating a National Policy on Library and Information Services in Malaysia" (Oli Hamid); (7) "Papua New Guinea--Case for a National Information Policy?" (Margaret Obi); (8) "A Brief Introduction to National Scientific and Technical Information Policy in China" (Zhang Fenglou); (9) "National Information Policy and the Progress of a National Information System in Thailand" (Nongphanga Chitrakorn); (10) "Changes to Information Demands and Activity in Scientific and Technical Information in USSR's New Economic Situation" (Oleg Shatberashvili and D. Alelishvili); (11) "The Computer versus the Human Brain" (Jacob Leev); (12) "Information for Industry in Thailand" (Nongphanga Chitrakorn); (13) "Information for Industry: The Australian Scene in 1990" (Susan Harvey); (14) "Information for Industry: Definitions, Clarifications and Needs" (Eliahu Hoffman); (15) "Information Dissemination in a Large Industrial Plant" (David Elazar); (16) "National Information Policy--the Availability of CJK (Chinese/Japanese/Korean) Records in the Australian National Bibliographic Network" (invited paper, Geza Kosa); (17) "Electronic Publishing--Status, Trends and Prospects" (Ian Dickson); and (18) "Electronic Publishing in Japan--A Review in 1990" (Naito Eisuke). Also included are the welcoming and opening addresses, recommendations and resolutions passed at the conference, and a list of 14 national delegates representing 11 countries. (KRN)

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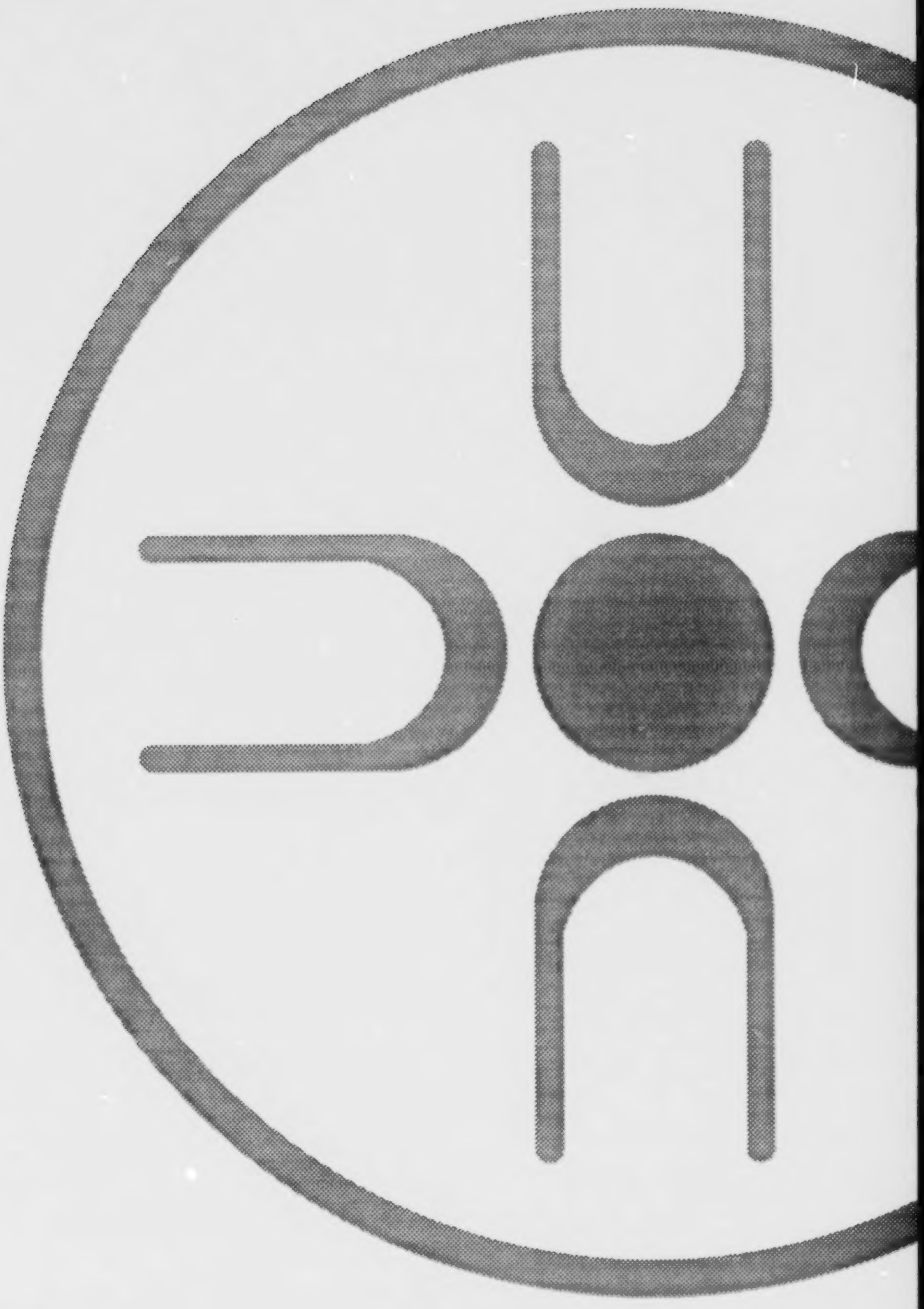

National Information Policies for the Asia Oceania Region

Edited by
Ian Dickson and Lisa Dwyer

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Opening Addresses

Welcoming Address

Sung Sang Park
President, KIET
Korea

Dr Ian Dickson, President of the International Federation for Information and Documentation, Commission for Asia and Oceania, Eminent speakers, National delegates, Members of Organizing and Advisory Committees, Distinguished guests, ladies and gentlemen:

I am extremely pleased to welcome all of you to my country, Korea, and also pleased and honoured to host the 11th Congress and General Assembly of FID/CAO here in Seoul. The theme to discuss at this conference is "National Information Policy". I believe that we have rightly chosen this topic in view of the importance of information for the business, for the scholar, for the government, and for every one else. Despite the importance of information to daily life, government policy for this end has not been satisfactorily resolved in most of the countries participating in this Assembly.

In the industrial society we live in today, technological innovation is the most powerful driving force for economic development. Technology innovation has been created from the process of combining managerial knowledge and technological information with creative thoughts. Therefore, technical progress in production and subsequent development of national economy may well be accelerated by effective management of technology information and all other information.

In reality, however, information services are not so well organized even in the developed countries. It has been attested by a survey conducted in the United States that many American companies have experienced failure in technology development activities due to ineffective support of information services. There are many cases in which they realize later that their R & D projects had already been completed elsewhere. Accordingly, their R & D manpower and an enormous amount of R & D funds have been wasted.

The modern business environment is rapidly changing in terms of technology, market, taxation, law, regulation, labour, finance, etc., so decision makers face an increasingly uncertain future in which their decisions will take effect. If a business firm is to choose the right course of action and avoid disaster, it must continuously search for new information, analyse and make use of all kind of information as comprehensive as possible. It is not too much to say that business competitiveness is determined by the speed of acquisition and quality of new information.

What matters in this era of the information society is not the shortcoming of information, as in the past, but the difficulty in selecting the right information out of a tremendous amount of information growing rapidly due to the fast development of industrial, printing and information technologies in particular. It is therefore imperative that enterprises and

government alike formulate policies and develop optimum systems in which explosive information could be effectively managed to be usable so as to speed up the pace of development. To this end, a Government's socio-economic development plans ought to include a sectorial plan for nation-wide information services dealing with:

- identifying the information needs of the nation;
- devising ways and means of meeting these needs; and
- promoting effective use of information services.

It is regretful to say that information policies have not been included yet in a series of socio-economic development plans from Korea being implemented since 1962, though our government has been urged to formulate information policies as soon as possible. In this regard, I do hope that the 11th Congress and General Assembly of FID/CAO will provide an important forum on which various aspects of national information policies are discussed and good policy options are derived there from for all the countries participating in this international conference.

Before closing my remarks, I would like to thank the officials of FID/CAO, members of Advisory Committee, Organizing Committee and everyone who has worked behind the scene for their cooperation in the course of preparing the 11th Congress and General Assembly of FID/CAO. I do hope that all the foreign participants have a pleasant and comfortable stay in Korea, and that this conference will be a useful occasion not only for your public life but private life as well.

Thank you.

Opening Address

Ian Dickson
President FID/CAO

Dr Park, Dr Choi, Professor Fujiwara, National Members of FID/CAO, Members of the Organising Committee, ladies and gentlemen, on behalf of FID/CAO I welcome you to this the Eleventh Congress and General Assembly of the International Federation for Information and Documentation - Commission for Asia and Oceania. FID is a very old organisation (it celebrates it centenary in 1995) which has shown international leadership in the information profession. It has a particular interest in scientific and technical information and has established a number of regional commissions. The Commission for Asia and Oceania is the most active of the four Commissions in FID and is a forum for countries in the region to come together and discuss common interests and problems in the area of information transfer. These meetings are invaluable for international understanding.

Consequently, we are indebted to our hosts for this Congress. The facilities and the environment are splendid, which helps to make people feel welcome and aids the interchange of ideas. The organisation of the meeting has been excellent. I must make special mention of Dr Lee and his team. They have coped with the inevitable communication and coordination problems with charm and grace and we must not underestimate the amount of work involved in organising an international conference of this size and diversity. FID/CAO sincerely thanks you.

I would also like to acknowledge UNESCO's contribution in providing support for some of the national members to attend this meeting.

The topic of the Congress is particularly timely. During my flight from Hong Kong, I was reading a newspaper article which dealt with the information explosion. I mention this for two reasons. Firstly, the content dealt with the rate of change with the information profession, a topic that we are all familiar with. Secondly, (and most importantly) the management of information is a subject which has now entered the public arena. No longer is the problems of managing information the problems of the information professional as it was ten to fifteen years ago. Everybody is now concerned. This does not mean that there is no role for the information professional - there is. In fact, it is imperative that we become involved as we as professionals understand the nature of information (which I often feel policy makers in government do not, especially in Australia) and are best placed to be involved in the solving of the problems of the information age.

Developing national information policies is not easy. I think I am safe in saying that no country has a comprehensive national information policy, and some (like the United Kingdom) have a policy <u>not</u> to have a policy.

The issues are large and daunting. They include:

- Freedom of access to information.
- Personal data.
- Moral and political constraints.
- Economic and social issues.
- Copyright issues - intellectual property.
- Legal issues.
- Transborder data flow.
- Manpower, education, training and retraining.

Countries in our region have considered all of these issues and tackled them in different ways. This Conference is a forum to exchange these ideas, and experiences.

FID has been a leader in this area and has published a review on National Information Policies; held a seminar on national and regional information policies in July, 1990 and information policy was one of the topics at the recent FID Conference held in Cuba in September, 1990.

I look forward to the issues that will be raised at this very significant gathering, and especially to the lively discussion and exchange of ideas with old friends and new.

I have great pleasure in declaring the Eleventh Congress and General Assembly of FID/CAO open.

Keynote Address

Industrial Information Policies of Developing Countries

Sung Jin Choi
School of Library Service, Sung Kyun Kwan University
Korea

Introduction

I am greatly privileged to be invited to give the opening keynote address at this meeting. My task as the first speaker is to state the principal issues and parameters of concern at this meeting, national information policies. Firstly, I will attempt briefly to review some of the policies for the provision of industrial information recently followed by the Korean government. Secondly, I will be talking about the people concerned with the formulation of the national industrial information policy, the people concerned with the implementation of the policy, and how it is formulated and implemented by them in developing countries in general and in Korea in particular. As I conceive my task, I should not analyse specific problem areas in other countries, offer solutions or recommend plans for action. These are the tasks of the speakers that follow. I will begin with definitions of industrial information and industrial information policy.

Industrial Information

The concept of industrial information is difficult to define. This difficulty arises from the fact that "industry", as we call it, is in no sense a unity. It is a broad and complex grouping of many differing and competing undertakings, relatively unorganised.

Since industry does not grow without markets and sources of capital, similarities in the economic preconditions for industrial development have been identified. These bases for the development of an industrial sector include an available labour force, markets for finished production, access to raw materials, a source of investment funds, and finally access to technology. Equally important to the development of industry is information on how to produce goods and services, information on sources of supply, information on consumer markets, and information on manpower available now and in the future. The efficient use of such technological, marketing, and management information is vital in all activities of any branch of modern industry.

The term "industrial information" is commonly used to refer to such information and know-how that are required and utilised by industries in order to facilitate their activities for production and sales of goods and services. A mistake that is often made is to equate industrial information with scientific and technological information. The broad expanse of industrial information is often underestimated. The intellectual activities within industry are very diverse and embrace quite a number of sciences, technologies, and other specialist fields.

Industrial Information Policy

Industrial information policy refers to a broad range of the objectives for which industrial information services in a country should strive. In the field of industrial information, as elsewhere, the determination of national policy lies with the government. The government gives leadership and guidance through the declaration of a national industrial information policy, and directs impetus to the policy's implementation by the provision of adequate funds and resources to a designated national authority.

The formulation of an industrial information policy is important. And the policy formulated must be workable for the country concerned. It is a waste of time to formulate a policy which is too idealistic. Preferably, policies should be in writing. Some feel that a policy actually does not exist unless it is written. Verbal and implied policies are frequently too nebulous and limited in their meaning to all interested parties.

The primary object of an industrial information policy is to provide research and development workers, engineers, technicians, managers and more generally, all who have some part to play in industrial activities with access to the information they need and this as economically as possible.

Review of Industrial Information Policies Existing in the Developing Countries

Few countries of the world can be said to have a coherent, comprehensive information policy for their industrial activities. Certainly, no developing country appears to have such a policy. Some are, however, undoubtedly developing industrial information policies in conjunction with their economic and social development plans. I will review briefly some of the implicit and explicit policies for the provision of industrial information recently followed by the Korean government.

Overall Industrial Information Policy Framework

The overall industrial information policy of the Korean government implicitly stated in the Sixth Five-Year Economic and Social Development Plan, 1987-1991, is that "the government will foster a closely co-ordinated structure which interconnects existing and future industrial information facilities at a national level to collect and process systematically information on internally and externally generated industrial technologies, research and development results, manpower, and others which are essential to the activities of modern industry, and disseminate it through a convenient local service unit and with a minimum of delay to engineers, technicians and managers in the industrial field who need it. The four major components of the national industrial information network will be Korea Institute for Economics and Technology (KIET), the information departments of the government-run research institutes, the Library of Korea Advanced Institute of Science and Technology (KAIST) and the National Science Library of Korea which is to be established in Daeduck Science Park. The government will strengthen the function by the government-run research institutes of gathering information on industrial technologies recently generated in foreign countries. The government will also foster on-line information retrieval services to industry through the new Consolidated National Information Management System which will be

operational during the Sixth Plan period" (1). Finally, "the government will foster the market for technological information by developing a technological information-gathering and marketing system and by supporting the development of commercial services for technological information" (2).

The Korean government's commitment to the promotion of industrial information services was also underscored in the Revised Sixth Five-Year Economic and Social Development Plan. The policy stated in the Revised Plan is that "the government will foster the industrial information supply system and increase the amount of the Fund for Overseas Investment with the Export-Import Bank of Korea to promote the overseas ventures" (3).

"A Plan for Industrial and Technological Information System" drawn up by the Agency for Administrative Development was submitted to and approved by the National Council for Science and Technology chaired by the Prime Minister in 1980. The main objectives of the Industrial and Technological Information System are:

1. To ensure that basic minimum of information services adequate to meet the needs of the whole industrial community are satisfied
2. To strengthen existing nation-wide industrial information resources
3. To co-ordinate existing national programmes of industrial information services
4. To encourage the private sector to become an active partner in the development of the national programme
5. To establish a nation-wide network of industrial information services (4).

These policy-related statements in three different documents jointly imply the recent intention of the Korean government to establish a greatly improved and closely co-ordinated system to collect industrial information and to disseminate it to those who need it effectively for the nation's industrial development.

Technological Information Policy

The recent technological information policy of Korea officially stated in the Sixth Five-Year Economic and Social Development Plan, 1987-1991, is "to help the existing technological information supply services based on KIET evolve into a more effective nation-wide technological information network, and establish standards in the field of technological information services" (5). In 1982, the Korean government merged Korea Scientific and Technological Information Centre (KORSTIC) and Korea International Economics Institute into KIET so that it could concentrate on industrial research and the dissemination of technological information.

Following the establishment of the Korea Institute of Science and Technology (KIST) in 1966, eight other specialized research institutes were established in such areas as machinery, electronics, chemistry, etc. to meet the increasing demand for higher technologies and to complement the functions of KIST. Each of these research institutes has a busy Technological Information Department engaged in the handling of technological information to provide information services to Korean industry (6).

In compliance with the national technological information policy, the Korean government approved the Proposal to Design the National Technological Information System submitted by KIET , which was implemented in 1985. The National Technological Information System is now operating with a centralized database to provide one-stop service.

Information Policy toward Small and Medium Industries

The policy of the Korean government for the provision of information required by the small and medium industries has evolved in conjunction with the basic philosophy of the policies for development of small and medium industries, which are mainly directed toward, among other things, technology improvement and management rationalization. The policy for information for small and medium industries stated in the Revised Sixth Five-Year Economic and Social Development Plan, 1988-1991, is to "provide local companies with better extension services on technology and market information by increasing the number of branch offices of KIET and the Small and Medium Industry Promotion Corporation (SMIPC)" (7).

SMIPC is a non-profit organization established in 1979 in accordance with the Small and Medium Industry Promotion Law for the purpose of implementing various programmes for the promotion of small and medium industries, including the provision of quality management and technology guidance to them. The major activities of SMIPC related to information for small and medium industries cover:

1. Improving and co-ordinating the delivery of managerial and technical assistance by the various supporting agencies for small and medium industries
2. Operation of its extension services that encompass virtually all areas of business management and production.

Marketing Information Policy

Because of its poor natural resource endowment and small domestic market, the Korean government adopted in the early 1960s an outward-looking development strategy emphasizing the growth of export. This necessitated the government to institute a policy measure to facilitate the provision of the latest overseas market information to the nation's industry. The marketing information policy toward industry pursued by the government in the past three decades was "to strengthen the information functions of Korea Trade Promotion Corporation (KOTRA) and KIET" (8).

KOTRA was established in 1962 when the first Five-Year Economic Development Plan was introduced. It is a non-profit organization financed by the Korean government. The principal activities of KOTRA and the services it provides include:

1. Providing foreign traders with information on products available for export from Korea and the names of suppliers of those products
2. Forwarding specific enquiries received from traders throughout the world to the appropriate suppliers in the country
3. Collecting up-to-date marketing information through its world-wide network and disseminating it to local firms (9).

Since its creation, KIET has also been playing an important role in providing the Korean industry with marketing information. KIET's five Area Studies Divisions conduct market research on target geographical areas of potential interest to help private enterprises identify trading opportunities overseas.

Financial Information Policy

In order to successfully implement the industrialization programme, it is essential to provide entrepreneurs with information on financing possibilities. They should be informed of the various financial sources which can be used for purchase of production equipment and facilities and for working capital. Korea lacks a stated national policy on the provision of this type of information, and hence there is no unifying concepts on which the operational policies for the various financial information services can be based.

At present, each financial institution with information activity sets and implements its own separate policy. The Financial Information Service of Korea Development Bank, for instance, concentrates almost entirely on the needs of its own customer group chosen in accord with the development strategies of the government which are stated in each Five-Year Economic Development Plan (10). Through its Enquiry and Answering Service, SMIPC provides small and medium industries with information on various funds available to the industries (Small and Medium Industry Promotion Corporation. 1985). The Small and Medium Industry Bank, and Korea Credit Guarantee Fund provide similar information services.

Management Information Policy

Decisions made by industrial managers can only be as good as the information on which they are based. This makes it extremely important that industrial managers have access to information. In real situations, they have great difficulty in getting relevant information when it becomes critical to have it within a short period of time.

The basic characteristic of management information activities in Korean industry is that they are, for the most part, responsibilities of individual enterprises. As in most other developing countries, these activities have so far developed without any plan to seek to interconnect them nationally. The large enterprises have established their own information departments to collect information necessary for their managerial decisions. But there remain a very large number of small- and medium-sized firms that are unable to run information departments of their own. Thus, the provision of government-supported management consultancy services established in such institutions as SMIPC, KIET, the Small and Medium Industry Bank, and Korea Productivity Centre, is aimed largely at the small and medium enterprises.

Policy for Communications Services

Communications services are closely related to the modern industrial information services. The stated policy of the Korean government for communications services is "to improve and expand communications equipment and facilities to meet the rapidly increasing demand for greater and faster exchange of information. During the Sixth Plan period, increased emphasis will be placed on developing communications systems - particularly video-meeting and telex networks - to build an integrated communications network. A public communication service system will be developed" (11).

During the period of the Fifth Five-Year Economic and Social Development Plan, 1982-1986, a total of approximately ten billion U.S. dollars was invested in the projects for expansion of telephone switching systems and the accelerated development of data communications networks. In order to implement these projects, Korea Telecommunications Authority was established in 1982 as an autonomous operating body for public telecommunications, and the Data Communications Corporation of Korea in the same year with the responsibility of developing nation-wide data communications networks and services.

Formulation of National Industrial Information Policy

Industrial information is an essential resource and one which should be administered by the establishment and implementation of a national policy. Some questions could be raised here. Who are the people concerned with the establishment of national information policy? How is it linked to industrial policy?

Industrial Information Policy as an Integral Part of the Industrial Development Policy

The economic growth of the developing countries requires a strong policy for industrial development. The development works mainly through the creation within the individual enterprise of a willingness to modernize and go forward. An industrial development policy will be fruitless if it is not supported and complemented by an incisive information policy, which aims at establishing a climate of modernization and progress. Thus, industrial information policy should be incorporated in the policy for industrial development, which in turn should be incorporated in the policy for achieving economic growth and other national goals.

Mechanisms for the Formulation of Industrial Information Policy

Industrial information policy is a set of policies to be used in conjunction with more general policies, i.e. industrial policy and technological policy, and principally to secure specific objectives, e.g. certain kinds of structural changes, improvement of particular kinds of services, or promotion of services to particular industry. It is therefore common practice in many countries including Korea that industrial information policy is formulated by the same people who establish industrial policy in parallel with those policies.

A set of new industrial policies were established in the early 1960s to stimulate the economic development of the nation. Export-oriented industrialization was adopted as the strategic course of development. The "administratively planned growth" of the Korean economy during the 1960s and 1970s was faster than the foreign-aid stimulated growth in the 1950s. Thus, it is viewed that the Korean government played a significant role in industrial development as well as trade expansion over the past three decades through effective formulation and implementation of policies. Throughout the period, the industrial information policies of Korea were formulated within the framework of the successive Five-Year Economic and Social Development Plans.

Formulation of General Economic Policy

General economic policy in Korea is formulated by the Economic Planing Board (EPB); industrial policy by the Ministry of Commerce and Industry (MCI); technological policy, by the Ministry of Science and Technology (MOST); monetary and fiscal policy, the Ministry of Finance and the Bank of Korea; and communications policy, by the Ministry of Communications.

EPB was established to institutionalize the government's planning function in 1961. It is responsible for economic planning, national budgeting, foreign capital management, and statistics. It sets macro-economic growth goals - including growth in trade, gross national products, production, prices, consumption, and government income and expenditures - in economic plans which cover a five-year period. The economic plans provide a policy framework for the future, as well as data on the direction of the economy, that can be used by private enterprises and policy planners in their decision-making. EPB has formulated six economic plans.

Preparation of a Five-Year Economic and Social Development Plan starts long before the beginning of the actual plan period, utilizing an input-output matrix and a dynamic projection model for testing the consistency of the overall plan as well as estimating sectorial investment and import requirements. The initial work is primarily macro-analysis to provide overall structure.

To work out the details of the tentative plan prepared by EPB, about thirty specialized working groups, each headed by a high-ranking government officials from a concerned ministry, are organized. Each group consists of government officials of concerned ministries, and experts from research institutes such as Korea Development Institute (KDI), banks, industries, labour associations, consumer groups, and universities. EPB officials act as secretaries to each team.

The detailed plans developed by the working groups are co-ordinated by the Economic Plan Co-ordination Committee chaired by the Vice-Minister of EPB. These plans co-ordinated and integrated by the Co-ordination Committee are then examined and approved by the Economic Plan Deliberation Committee chaired by the Prime Minister.

This Committee debates on and approves the drafts with relatively minor adjustment. Actual plans are prepared by young bureaucrats in close co-ordination with KDI staff. KDI sponsors about ten Economic Policy Conferences in important policy areas. At these conferences, related working groups' plans are presented and commented on by participants from all walks of life. Suggestions made by the participants are valuable and greatly assist not only in determining the best policy but also in winning their acceptance, understanding, and co-operation.

Formulation of Industrial Policy

The Ministry of Commerce and Industry (MCI) has principal responsibility for formulating the industrial policies of Korea and ensuring their success. Along with its responsibility for the establishment of industrial policy, MCI is responsible for trade policy, the regulation of distribution systems, patent policy, industrial standardization policy, and small industry.

MCI's Industrial Policy Bureau has prime responsibility for the formulation of industrial policy. The process begins with developing draft policy on the framework of the Five-Year Economic and Social Development Plans, which do not, as a rule, contain more than broad general guidelines on the course of industrial development. The draft policies are confirmed pending evaluation and review by various industry-related committees as well as consultation with relevant ministries. Important policies and plans are determined after review by the National Council for Industrial Policy, which is responsible for the evaluation of industrial policies.

To reach a broad national consensus on the nation's industrial policy, a Private Sectors' Consultative Meeting on Industrial Development was formed under the National Council for Industrial Policy in 1985. The Meeting, which consists of representatives of industries, consumer groups, banks, the press, R & D institutes, and universities, seeks out a broad range of public opinions. The Meeting seeks out business opinions on industrial, fiscal and financial policies and recommends them to the government.

Formulation of Technological Policy

In developing countries, where the scientific and technological level is low and industry is almost incapable of developing industrial technology, governments must play a leading role in all areas. With this in mind, Korea made some achievements in laying a foundation for the development of science and technology in the 1960s and 1970s. Recognizing that systematic efforts to develop science and technology must be preceded by a realignment of administrative agencies responsible for science and technology, the Ministry of Science and Technology (MOST) was established in 1967. MOST formulates basic policies on R & D, cultivation of skilled manpower, international technical co-operation, development of research organizations and resources, and creation of a favourable societal climate for scientific and technological development.

Responsibility of the Information Profession

Korea possesses the mechanisms needed for setting up its industrial policies, of which the industrial information policy is an integral part. These mechanisms have functioned to draw up some policies for industrial information in parallel with the industrial policies and technological policies, but not in an integrated manner. Industrial information policy problems should be made more clearly heard by the government. That is, of course, the responsibility of the information profession in Korea.

Mechanisms for the Implementation of Industrial Information Policy

Once a national policy has been formulated, it must be implemented. This link is by no means automatic. Implementation represents one tier of means while policy planning represents the other tier of ends. It is in this context that policy planning and implementation could be viewed as a continuing process of action rather than separate processes, though the concept implies two distinctive stages of action. Nevertheless, a gap between policy planning and implementation may exist, as policy planing by the government tends to be incomplete while implementation is left mostly to the private sector.

There is a crucial discontinuity in the means-ends chain at the point where the government's control stops and the private sector takes over the remainder of the chain. The crossing of this interface is critical bottleneck in implementation. The lowest tier of the government planning is a set of mechanisms whereby individual and enterprise compliance is stimulated, forced, or cajoled. A discussion of implementation can usefully concentrate on these means whereby the crucial interface is crossed, i.e. intervention mechanisms.

The extent of government intervention can be defined by two major variables: the mode of control and the instrument of intervention. In a country where economic control by the government is limited, two modes of government control are applied:

1. Direct control by which government undertakes certain activities by itself
2. Indirect control by which government stimulates private initiative and participation in certain activities.

Government utilizes two instruments:

1. Finance made available primarily through taxation
2. Power stemming from national sovereignty.

By combining the two major variables one can visualize four intervention mechanisms:

1. Government budgeting
2. Public institutions
3. Regulation
4. Inducement.

One of the characteristics of the Korean implementation system in the field of industrial information policies has been the emphasis placed on the utilization of public institutions and regulation.

Conclusion

It would seem difficult to make identical recommendations on the formulation and implementation of national industrial information policy for an entire group of developing countries since there is no single general formula in the field, and the developing countries are by no means a homogeneous group. There is great variation between the developing countries not only in terms of economic growth but also in terms of information activities. Each government must develop its national industrial information policy in the light of its own circumstance. The developing countries could, however, benefit from the policies existing in a country at a similar level of development, by assessing their constraints and opportunities. This keynote address is intended to serve the purpose of such a reference to policy makers in the other developing countries within the Asian and Oceania region.

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National Information Policy

National Information Policy. Current Trends and Issues - an Australian Experience

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The Historical Perspective

The search for a National Information Policy in Australia can be traced back to the establishment of the Australian Advisory Council on Bibliographic Services (AACOBS) in 1956 (1). This was a large body, with representatives from all kinds of libraries and many specialized committees. The Council's establishment reflected a desire within the library community to develop the national library resources of Australia in a more organized manner.

In the latter part of the 1960's, possibly as a response to the activities of the OECD Information Policy Group, a perception developed that the information resources then available in Australia were inadequate for its continued economic development. In May 1970, a meeting was held between a number of Australian governmental departments and agencies and the National Library to consider the nation's scientific and technical information needs. As a result of this meeting, the National Library Council (NLA Council) established a Scientific and Technical Information Enquiry Committee (STIEC), with representation from the NLA council, the Commonwealth Scientific and Industrial Research Organization (CSIRO), University and College libraries, representatives of other Government departments and private industry. STISEC produced its report in May, 1973.

It concluded that Australia should have a national STI authority and that Australia's national STI resources and services should be improved. The STISEC recommendations were accepted in principle by the Federal Government. However, this was followed by a protracted debate on their implementation. In August 1974 the NLA was allocated $1,025 million to carry out a study on an Australian Based Information System (ALBIS). However, the money was not spent as the study was never carried out.

In 1976 a Committee of Enquiry into Public Libraries pointed out that there was inadequate provision for ethnic communities, the aged, the handicapped and Aboriginals. The report proposed a ten year co-operative plan involving Commonwealth, State and local government to rectify this situation.

A task force on Departmental Information under the direction of the Royal Commission on Australian Government Administration carried out a Review of Departmental Information Programmes in July 1980. This evaluated the effectiveness of the flow of information to the community, especially to disadvantaged groups. As a result of their recommendations the Task Force proposed a draft information policy. The draft began with the statement:

> " The Government accepts that every Australian has a right to know about his or her rights and obligations under Commonwealth law, the services available through the activities undertaken by Commonwealth departments and authorities."

Two Inter-Departmental Working Groups were established to review the changes which had taken place since 1976. The 1979 Working Group (which reported in September 1980) recommended that the Commonwealth should play a significant role in the nationwide cooperation and co-ordination of library services. It proposed that this could be achieved through the establishment of an Australian Libraries and Information Council (ALIC) and the strengthening of various Committees of the National Library of Australia. It was hoped that this would ensure effective co-operation between Australian Libraries and the Information Council, and support the activities of the Australian Advisory Council on Bibliographical Services (AACOBS) through the National Library. ALIC was established by the Federal Government in 1982 to advise all levels of government (federal, state and municipal) on issues affecting library and information services and to develop 'a national plan' for these services. In pursuit of its mandate, ALIC published an 'Issues and Objectives' working paper (June 1983) and prepared a 'Plan for Library and Related Information Services in Australia'.

Unfortunately ALIC failed to give much practical advice to government and was considered by the information profession to be ineffective in dealing with major issues.

Five years after the establishment of ALIC, a review committee was set up to examine the activities ALIC and AACOB. The committee recommended merging the two to form the new Australian Council of Library and Information Services (ACLIS). This council (established in 1988) is library orientated and to date has been ineffective in developing a coordinated national information policy.

In the last two decades, both AACOBS and the Australian Library and Information Association ALIA (until recently the Library Association of Australia, LAA) have put forward a number of National Information Policy proposals.

The most comprehensive step towards a National Information Policy was a framework of action for the development of an Australian Information Policy as described in a discussion paper on National Information Policy published in 1985 (2).

In October 1983, the Caucus of the Australian Labour Party called for the implementation of a National Information Policy in the ALP platform. In response, an Interdepartmental Meeting recommended a framework for the development of the Policy under the auspices of the Department of Science. The framework of action included the preparation of a Discussion Paper on National Information Policy. To assist the discussion, this paper was made available to participants of a "National Information Policy Workshop" (3) which was held in Canberra on 3-4 December, 1985 and the Science and Technology Information Workshop in March, 1986 (4).

The post 1986 general election departmental restructuring dismantled the Department of Science as a separate entity, and the information policy initiatives were lost before any recommendations could be reported to Cabinet.

Current Development in Australia

Where is Australia's information policy at present? 'Nowhere' according to Peter Judge (5). The Australian Council of Library and Information Services (ACLIS) is not a governmental body, but a membership body composed of almost 400 libraries. Its activities are related to resource sharing, and the National Libraries Summit in 1988. According to Peter Judge, ACLIS appears to be spelt with a large 'L' and a very small "I", and he thinks that a government policy is more likely to lead to "rationalization'. It is better to get on with the job through the existing national information organizations rather than just talking about a policy. If that is the case what are Australia's information institutions doing?

The National Library of Australia

The National Library of Australia (NLA) has a key role in Australian library and information services and many of its services reflect aspects of an information policy for the nation. The NLA recently underwent a Review. This Review arose in the context of the required standards of stringency in relation to public administration. The Review was carried out in 1988 and addressed the following issues:

- The appropriate level of services the library should provide.
- The staffing and financial resources required for the delivery of these services.
- The scope and appropriateness of changes for these services.
- Other measures which might be instituted to increase on budget, and off-budget revenue raising by the Library.
- The development of indicators for efficiency and effectiveness.

One important element of the Review was the re-examination of the role of the national library in collection development. As the role of the NLA for the 1990s would be greatly different from its earlier collecting model, the NLA has redefined its collection development policy.

Collection Development Policy of the National Library of Australia

The collection development policy acknowledges that the National Library can not operate a Library of Congress type of acquisitions. Instead, it proposes collections of excellence in a limited number of areas. As pointed out in the 1988-89 annual report, the approach taken was to focus more carefully on achievable targets in each subject area, and in particular to redefine priority areas towards collecting Asia and Pacific material in preference to Europe (6). Although the basic philosophy was unchanged in the final version of the Collection Development Policy, new sections were included, addressing policies on science and technology, intergovernmental organizations and preservation. Many changes were made at the detailed level. Because of the rationalization of the CSIRO, the NLA had to rethink its science and technology policy.

The review recommended:

- That the Library continue revision of its collection development policy and publish the revised policy at the earliest opportunity.
- That the Library incorporate the collection development policy into the strategic planning process and the collection development policy be reviewed at regular intervals of at least every three years.

From this Review one can see traces of the trend of an information policy in Australia:

- That the Library encourage and facilitate co-operative national collection development in the interests of maximizing the use of library materials held in Australian Libraries. The objective of reaching agreement on a national collection development policy will be an outcome of the Australian Libraries' summit.
- That the Library investigate the cost-effectiveness of mounting a national collection conspectus database to support co-operative collection development.
- That the Library's acquisitions budget be maintained at its present level until the wider issue of Commonwealth Government funding to Libraries is fully investigated.

Distributed National Collection

It is obvious that the NLA with its present budget distribution cannot collect extensively in a global sense. The concept of a "distributed national collection" has been introduced to address this problem. For example, an agreement has been reached with La Trobe University on a long term loan of the NAL's Latin-American material. La Trobe University will interfile this material with its own Latin-American material. The NLA will reduce its involvement with Australian Capital Territory material, transferring all of its material relating to the ACT to the ACT Library Service. This presupposes not only a long term redistribution of these materials, but also the national responsibilities of those institution in terms of cataloguing, loan and conservation.

If the concept of a distributed national collection is implemented effectively, the NLA's role will change significantly, as will that of other research collections in the country. As interpreted by some library professionals, (7) this means that the nation's research collection will probably be embodied in Australia's higher education collections. CSIRO is currently devolving itself from a national science collecting role. Until the 'distributed national collection' on science and technology is established, a vacuum will exist in this area of service.

There is probably a need to increase the document delivery role of the NLA. The NLA considers its holdings of overseas materials as one part of a distributed national collection in which all major Australian Libraries have a part to play. The Australian Bibliographic Network should facilitate further library co-operation and keep duplication to a minimum.

National Co-ordination

It goes without saying that the National Library possesses the resources required for the national coordination in conspectus, and the operation of the distributed national system. Although its coordinating role is more widely accepted by the library and information community in Australia, particularly through the Australian Library Summit, it should have been more involved in the overall coordination of library activities than it is at present. The Review Committee of the NLA unfortunately did not examine the Library's operations in relation to ACLIS in any detail. The Review Committee only noted the fact that ACLIS should become self-sufficient. The problem that ACLIS relies heavily on a number of committed individuals and overlap in the functions of NLA and ACLIS still remains unresolved.

Is there a Policy on Science and Technology Information?

In the 1970s the Commonwealth Scientific and Industrial Research Organization (CSIRO) was generally considered to operate the de facto national science and technology library.

In 1970 the National Library Council established a Scientific and Technological Enquiry Committee (STISEC) and it recommended a national STI authority and service. In 1978 the Australian Science and Technology Council (ASTEC) recommended that further examination be made of library based STI services and that CSIRO should take a lead and expand its role in this area. The Birch review 1978 urged an expanded role for CSIRO in interpreting and disseminating international S & T information for the benefit of Australian industry and suggested CSIRO take a leading role in the national library and information service network.

The Changing Role of CSIRO

Throughout the 1970s, and 80's, the resource base available to CSIRO contracted and any pretence that CSIRO constituted the national STI resource became no longer valid. A 1987 amendment to the Research Act enhanced the research transfer and application responsibilities of CSIRO as well as confirming the secondary responsibility of providing a broader community information interpretation and transfer service. The ability for CSIRO to perform an information role broader than support for its primary research is quite constrained under its present funding arrangements.

In summary, there has been a diminution in CSIRO's ability to take part in the Australian STI systems much beyond providing library and other services to CSIRO itself. There is no detailed policy within CSIRO for information, despite CSIRO being Australia's biggest producer and user of S & T information.

CSIRO legislation does give it an obligation in this area but the resource and infrastructure base does not allow it to fulfil these responsibilities. CSIRO is developing policies and taking actions in an attempt to meet its charter in this area, thus contributing to Australian understanding and use of science and technology information for the national benefit.

The Australian Library and Information Association (ALIA)

The Australian Library and Information Association is the formal professional association concerned with Library and Information Services of the nation. One of ALIA's objectives is to promote library and information services through an Information for the Nation (IFTN) campaign.

IFTN was conceived in May 1987. It is a practical expression of the Association's interest in a National Information Policy. With limited funding the IFTN programme (8) has in the last two years:

- secured the interest and financial support of the influential Commonwealth Department of Industry, Technology and Commerce.
- initiated and successfully completed the first national report on the links between State Libraries and Industries, resulting in several new initiatives and a proposal for extending the study to academic libraries.
- helped to place library promotion on the library profession's agenda to the extent that it was a significant topic at the Library Summit and has become a major thrust of ACLIS.
- stimulated the mounting of the very successful First National Library Promotion Forum.
- placed library and information issues before two national communication conferences.
- drawn the attention of politicians to library and information issues.
- secured the interest and active desire to support library promotion from many members of the profession at the grass root level.

Forces that Undermine a Centralized National Information Policy

As Australia is a democratic society, it must live with the pros and cons of this political system. Every issue must be discussed and open to the democratic process whereby issues are agreed upon and implemented. The democratic process is time consuming, and during that process, the issue under discussion may change with time under the influence of consensus and compromise. There are many opposing forces in play before issues can be resolved. One of the snags of the democratic process is that decisions are not made quickly.

The experience of the past has shown that because of the wide interest in information, many committees have been established and yet none have had the real power to push forward a national information policy. One effective committee or institution in hand would be worth more than ten Committees, irrespective what they are called, be it AACOBS, ALIC, ACLIS, STISEC, NLA, CSIRO or the Department of Science.

Under our present political climate, it seems as though Australia is in the grip of the methodology of rationalization and review in lieu of long term forward planning. This is partly due to financial stringency. Our politicians may see that this is the best way to give the appearance of improving efficiency and accountability. A review looks primarily at the past and less to the future. It is often limited in scope by its terms of reference, or by the structure of the organization under review. It is not practical to have too many reviews and too few actions. Reviews must be complemented by effective remedial action. Australia needs more forward planning to compensate what it has missed in reviews.

The reminisces of a former Director-General (9) of the NLA, describe the effect of bureaucracy on our National Information Policy. When asked to present his views on AACOBS, ALIC, ACLIS, Harrison Bryan said:

> "I don't think we have done as well as we should, because we did not do ALIC properly. The problem with AACOBS, and I think the continuing problem with ACLIS is that they never appeared to bureaucrats as other than pressure groups, as interested parties. The possibility that arose with ALIC seemed to be that it could be considered by them as a group of equals whom they understood, because ministers who determine policy are enormously influenced by their bureaucrats, and bureaucrats listen to bureaucrats, which is why having people with competence in bureaucracy is so important at the National Library and which is why I think the library profession should think of the Director-General as a top bureaucrat who is in the position to influence the Commonwealth Government .... I saw, and still see, the possibility of an organization like ALIC living harmoniously, and with mutual benefit, with an organization like AACOBS. I can understand the reasons why ACLIS has emerged, and it's greatly to Warren [Horten's] credit that he has swung the National Library behind it to make it effective. But it can only be effective as a lobbyist".

When asked how realistic any discussion of a national information policy is in a country with a federal system of Government like Australia, Bryan answered:

> "I don't see why each of the seven (state) governments should not seriously consider the adoption of a statement of policy relating to information. That is quite different from a plan, a national information plan, an element of which could be the coordination of the elements we are considering. No, I don't think it impossible to have a national information policy because that might be a sum of State and Commonwealth information policies. I see nothing difficult about that ...".

On the problem of the many interest groups involved in the formulation of a national information policy, he added,

> "The possibility of a national information policy coming from the Commonwealth Government is certainly gravely threatened by the policies, ambitions and hopes of the bureaucrats in various government departments."

Does it Matter if Australia Has an Information Policy?

An article on American companies in "The Australian" of 11th August, 1989, reported that

> "Information itself is becoming a product, and there is a need to fully and effectively use sophisticated information gathering systems as part of .... decision process(es) or suffer the competitive consequences". (10)

This reflects how important information is to our society. As Australian business has to operate in a turbulent and volatile global market, information has become important for survival.

It is thought that there is a need for large organizations in the private sector to have a Federation of Information Systems. Organizations require a range of information services for people working at different levels, developed from key information sources and using different types of information systems. The lesson is that if the private sector needs such services for survival, a nation needs it more.

It may be concluded that Australia does need some form of a National Information Policy, despite the fact that it may not be possible in our system to achieve one coordinated national information policy. It is important that we should strive for formal national information policies and to ensure that such policies are implemented with the help of the NLA, ACLIS and particularly with the understanding of the bureaucrats. It is hoped that Australia will see a formal national information policy materialize in the near future.

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An Information Policy for Hong Kong

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Hong Kong is unusual among Asian countries in that it has undergone a rapid rate of development in the last 20 years, extending its previous commercial and entre-pot activities into new industrial growth. Its small area of approximately 400 sq. miles, of which only a small proportion is easily developed, and its relatively large population of approximately 6 million, means that certain types of agricultural and industrial activities requiring relatively large amounts of space have a low priority compared with intensive industrial activities. These range from textiles and garment making to light engineering and moderately high value products, as well as consumer goods such as toys, light electrical and electronic products, jewellery, domestic hardware, furniture and so on. On the other hand, the compact nature of Hong Kong allows first-class internal communications both within the colony and more widely in Asia.

It is the policy of the Hong Kong Government to encourage industry to expand and diversify particularly towards the production of high value-added products and into industries relying on modern technology. However, the Government does not attempt to influence the economy with a very detailed plan, but relies on a well developed sense of entrepreneurship in the local population, together with capital and technological injection from a wide variety of technologically skilled countries.

Despite pleas from concerned individuals, it is unlikely that Hong Kong will generate significant indigenous research and technology in the near future. However, it is becoming skilled at adopting and adapting technology from abroad to the local financial, building, land, manpower and market resources. Since Hong Kong has virtually no natural resources apart from skilled labour, it aims to import most of its raw materials, and exports semi-finished and finished products with maximum added value retained in Hong Kong.

The expansion and diversification of Hong Kong industry is now beginning to settle into reasonably well defined patterns and it is highly desirable that a national information service, perhaps primarily concentrating on the needs of industry, should now evolve with the support of Government and those bodies involved in economic, scientific, educational, social and cultural activities.

An Information for Industry Service in Hong Kong

The creation, further processing and circulation of physical commodities ranging from the exploitation of raw materials and semi-finished products to the recovery of used products and scrap is either already well established or rapidly developing in Hong Kong. Similarly, most trade, commercial, financial, legal and similar supporting services are well developed. However, there is an important exception to the satisfactory development of support services to industries in Hong Kong generally and this concerns research and development.

Although it is extremely important and growing rapidly, the industrial economy of Hong Kong is relatively small by world standards and is narrowly based. It is therefore very unlikely that the Hong Kong industrial economy as a whole could support a major research and development effort of its own whether based on Government laboratories, private enterprise or both. Furthermore, it has been Government policy to allow free market forces to dictate most industrial development in Hong Kong and such a policy has not, in the past, been compatible with Government planned research and development, which must necessarily take a medium to long-term view. Under these circumstances, Hong Kong tends to rely on imported technology and, at most, "localize" this technology. In the absence of a major research and development policy, which would itself require a significant information service, a well coordinated information for industry service is the most effective substitute. It would cost at least one order of magnitude less than a very limited research and development policy. The question is not whether Hong Kong should have an information for industry service, because the rudiments of such a service already exist, but rather how such a service should be organized, financed and controlled. It is also necessary to distinguish very carefully between an information service and a library system. While an information for industry service would to some extent be dependent on good library facilities its essential function would be to analyze current and near future needs of industry for information, often in a highly specialized form, to gather together that information, research it and repackage it in a form which communicates the information to the user in the most readily useful manner.

An information service acts as a broker between a vague mass of information suppliers and a more accurately defined set of client users. In general, information officers do not generate new information in the same sense as researchers generate new technology. Essentially they have two main skills. In the first place, they are aware of the profile of information at their disposal and they attempt to analyze the profile of information needed by the client. The second skill resides in selecting appropriate information from the broad profile and communicating it to the user in the most efficient manner. The most important administrative aspect of an information service is to operate the service economically. The amount of information available is virtually unlimited in extent and ultimately in cost. Only a tiny fraction of all that is available is likely to be of direct use to typical Hong Kong clients. However, carefully selected, arranged and communicated information can be extremely valuable to such clients although it is difficult to get most clients to realize the cost of providing information let alone its value to them. To be economic the service must therefore rely on very careful buying of selected information and energetic selling of information packages. In its most selective form for a particular client with very specific needs, the information supplied comes as a result of information officer work which is close to original research and first-class consultancy work.

At the more general extreme, much information can be transmitted to a wider clientele through the media of journals, current awareness lists, abstracts, cuttings, and the release of books, films, video tapes, checklists, wall charts, monographs, computer software, decision-making models, materials selection models, and so on. Not only will the method of communicating information vary according to client's needs but the level of sophistication will vary also. Some clients will have staff qualified enough to be fully aware of what information is required and to take full advantage of that supplied. They may further have the staff capacity large enough to absorb large quantities of information and localize it within the

company themselves. Such clients, usually striving for a high rate of development growth, are virtually capable of operating an information system for themselves. At the next level there will be many client entities who have qualified staff but in such small numbers that they do not have capacity to take actions either in investigating their own profile of information needs nor to search through the procured information to an extent that would increase their rate of development and growth. This is the band to which most information services apply the majority of their effort and for whom they are usually most successful. The third level includes clients who do not have the staff capability for clearly analyzing the need for information nor for interpreting information already at their disposal but still have an entrepreneurial spirit of survival and growth. To be effective at this level an information service has to put in a lot of effort to supply useful information in an easily assimilated form.

The information flow and the conversion of knowledge into practical results is the key to progress for the individual company and is more important in many ways than science and technology itself. The information flow must be appropriately arranged, i.e., the structure and means chosen must take into account the background, the understanding and the conditions of the individual clients at the time the information is provided. The information requested has to be procured on the client's behalf and must be presented using means and language familiar to the client. Guidance must be offered on how to convert the information into practical results. Lack of appropriate information can inhibit growth; prolific information would not only be exorbitantly expensive but would also be confusing. If the information strategy is important to the company then the strategy for an information service should be important to Government. Repackaging of information can be regarded as part of the national educative programme for which Government is mainly responsible.

There is an additional reason why Government should be involved in the strategy for an information for industry service. Only in the initial stages should information be provided free of charge. Information as a commodity or a raw material has a value as have other raw materials. However, it is a widely accepted experience that the most sophisticated information services do not operate at a profit, particularly in their early years. Most information services are subsidized by Government or their indirect costs are recovered through means other than client fees. In most countries, a successful network of scientific and technical documentation services, including data banks, is a manifestation of Government's will to make open access to information in books, journals, archives, statistics, etc. and to see that information is repackaged in ways relevant to various users groups within education, science, research, public enterprises or private enterprises. Such networks are usually centrally coordinated because they are costly and are extensively used only by a few clients unless it is Government policy to promote their wider use as an important aid to overall economic advancement. The purpose of repackaging information is to meet the need, and even to stimulate the subconscious need, of a target group of prospective users for information which could improve their operations if they were aware of its existence and if it was presented in an attractive form and in language geared to their operating conditions and personal qualifications. In Hong Kong, although several organizations have good communications with particular sectors of the Hong Kong economy, only Government has the wide researching contacts to stimulate demand for information over the whole of its economy. It is a consequence of Government's official encouragement of industrial expansion, use of higher technology and increased value-added in Hong Kong, that Government should also stimulate the market and see to it that relevant knowledge for different prospective user

groups in the community is identified, repackaged and brought to these target groups, be they aware of their need or not. In this sense, repackaging of information is a technological service to be organized as part of Government's policy for stimulating industrial growth. It need not be carried out by Government itself but rather by existing services within the infra-structure of professional institutions already supported by Government. However, the policy and co-ordination of information services should be a Government responsibility. Government is a substantial user of information itself, increasingly in matters of a technological, economic or management nature and therefore has a substantial interest in the more efficient promotional use of an information service.

The Components of an Information for Industry Service

An industrial information service has the job of collecting, evaluating and making available information on industry and industrial operations, i.e., techno-economic data; knowledge of technology; data on the structure of industry, on productivity, on investment feasibility studies, establishment of industries, transfer of technology, assessment of technology. An indirect aim of a Hong Kong industrial information service should be to compare local conditions and opportunities for industrial and commercial operations with international experiences and thereby provide guidance to investors in the private and public sectors for policy decisions. The main aim is to aid industrial enterprises in achieving progress in the market and economic growth by persuading management, staff and personnel to make the most extensive use of existing techno-economic, technological and scientific knowledge and of research results. It should foster critical and selective provision of any kind of information of use to industry, not only from published sources or from records of research and scientific results, but also from any other qualified sources available, domestic or abroad.

The central operations are carried out by information officers. These are expected to become personally acquainted with the structure of industry in the areas to be served, distributed by sectors of industry, by sizes of enterprises, and by levels of sophistication. They should become personally acquainted with individual enterprises in particular sectors, their commercial and technological activities, their organizational structure and management, their staff and personnel and their qualifications for converting information into practical results. They should also be acquainted with the structure and services of other institutions within education and training, research, libraries, documentation services, or public authorities. Information officers need to call on and exchange visits with industrial enterprises to discuss with members of management staff and personnel in order to identify needs for information and other areas of support and services and to express these in the form of an "information needs" profile. Very often, the information officer himself has to define problems that have to be solved and then he can assist in defining the needs profile and working up the request for service. He then needs to see that the service is provided adequately and follow up the service such that he can be sure that it has been understood, adapted and converted into practical results. Collectively, the inter-action between individual information officers and clients helps to identify areas and needs for training courses, conferences, exchanges of experiences among companies within a sector of industry, and across sectors of industry. It often allows evaluation and provision of programmes for group training and study tours for firms. Finally, a successful techno-information service unit accumulates a lot of valuable know-how in matching information to a client's needs and communicating that information efficiently, not necessary always by the printed word.

Infrastructure - Libraries

The plans for an information for industry service, which may well be extended to commercial and Government sectors, are aimed principally at the extension aspects of the total information policy. The library resources in Hong Kong are well developed even though Hong Kong is not endowed with a large number of libraries. The most important libraries from the point of view of recovery of scientific, technological and economic information are the libraries of the University of Hong Kong, the Chinese University of Hong Kong, the Hong Kong Polytechnic and the City Polytechnic. Fortunately, between them these libraries have very considerable holdings and in addition have access to a multitude of databases overseas both full text and bibliographic. These libraries could provide the main elements of the infrastructure for a National Information System if necessary.

The Government of Hong Kong is of the opinion that the expenditure on the university and polytechnic libraries can correctly be regarded as expenditure on improving the information capabilities of Hong Kong. In the absence of a national library in Hong Kong, these libraries must play a rather wider role than that of a traditional academic library. For example, the Hong Kong Polytechnic Library, for an annual fee, makes its resources available to personnel in Government Departments and in major industrial and commercial concerns in Hong Kong through borrowing privileges and the use of information services.

There is good cooperation between libraries in the provision and transfer of information. A messenger scheme has been set up to facilitate the interlibrary loans of books and periodical articles. Free exchange of photocopies of periodical articles between the institutions has been agreed. Plans are being formulated for a computerized Union Catalogue of all the holdings of the tertiary libraries - monographs, serials and audio-visual materials. However, this does not mean that the libraries are, or ever will be, self-sufficient - extensive use must be made of interlibrary loans from overseas, particularly from the British Library Lending Division.

Infrastructure - Industrial Information Services

The service offered by the Hong Kong Productivity Centre (HKPC) is one example of an information for industry service.

HKPC's Library has a collection of over 500 journal titles and 10,000 technical reference books and directories. It also maintains a computerized Union List of Serials in Hong Kong for quick and easy reference on the availability of journals in Hong Kong.

HKPC provides specific information on topics requested by clients. More than 400 international databases of various disciplines can be accessed electronically to provide the latest and comprehensive information promptly. There is a strong demand for information on patents and trademark, as well as on the worldwide market situation of various new products. Other topics of interest include engineering, applied science, management and environmental control.

HKPC compiles Monthly Information Update for subscribers on specific topics of fast moving product and process technology, e.g. Disk Drives and Liquid Crystal Displays. It also compiles monthly patent reports covering specific product groups, which provide a wealth of product ideas and stimulants for innovative design. Such reports include Toys, Domestic Appliances, Information Technology, Consumer Electronics and Clocks and Watches.

Technical bulletins aimed at specific -sectors of industry are published on a regular basis. These include the monthly Electronics Bulletin, the bi-monthly Metals Bulletin, Plastics Bulletin and Textiles and Clothing Bulletin, as well as the quarterly Green Productivity on environmental management. HKPC's team of Field Information Officers maintains close contact with specific sectors of industry and collects the latest technical and market information for the Bulletins. These are distributed free-of-charge on a controlled circulation basis.

Other organizations providing some service to industry include the Trade Development Council and the Federation of Hong Kong Industries.

Conclusion

If a relevant and coordinated information service is to evolve in Hong Kong it should serve Hong Kong educational needs, the needs of industry, social services, and certain Government Departments in a reasonably economic manner. It will have an incentive to be an economic and efficient service because it should be expected to derive a significant proportion of its fees, say, one-quarter to one-third, from industry in general and from specific clients. There should be no difficulty in finding appropriate sources of specialized information, mainly from outside Hong Kong, and eventually in coordinating these into a common computerized system. The geography of Hong Kong is such that the specially selected data resources can relatively easily be extended to Hong Kong industry. With some international financial support, it should be possible to extend this service beyond the borders of Hong Kong at marginal costs. The excellent communication facilities of Hong Kong suggest that it might become one of the natural focuses for international information resources in Asia. Unless there were liberal additional financial support from international sources for information services in Hong Kong, the type of data and resources connected together would be almost entirely dependent on Hong Kong's own needs and these are unlikely to cover the whole spectrum of scientific, technical and social information available to or needed by the whole region. Hong Kong's needs are much more likely to be felt in the areas of technology transfer, techno-economic surveys, market analysis and the modernization and optimization of production processes rather than in current research over a wide scientific and technological front .

This paper is based on a paper co-authored with Dr. J.C. Wright entitled A Scientific, Social and Technological Information Service for Hong Kong" which was presented at The First UNISIST Meeting of Experts on Regional Information Policy and Planning in Southeast Asia held in Bali, Indonesia in July 1977.

Further Reading

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A National Information Policy in Indonesia

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Introduction

The concept of information as a national resource for economic development has been accepted in Indonesia. The 1988 Guidelines of State Policy mentioned that the Science and Technology Information Network has to be strengthened to support the development of the national capability in science and technology and to accelerate the socio-economic and industrial development of the nation. The need to have a policy in the field of Scientific and Technical Information (STI) services in Indonesia has been identified for a long time. In 1971, an STI network had been established among special libraries in Indonesia. A certain rule or policy undoubtedly was needed. That was the time when Indonesia start thinking of a national policy in relation to the efforts to establish a national system for STI.

UNESCO suggested that the formulation of national information policy necessitates the establishment of a National Information Policy Body (NIPB). The establishment of an NIPB in Indonesia was not as easy as it was expected. Although Indonesia is still facing some difficulties to establish the NIPB, efforts to formulate the needed policy had started in a slightly different way. The following reports the effort and achievement in the formulation of the national information policy in Indonesia.

National Information Networks

Indonesian librarians, have long been aware of the need for libraries to work together to share information. In 1971, a seminar on Scientific Documentation and Information Network for Indonesia was held in Bandung in order to develop cooperation among special libraries in Indonesia.

The idea of resource sharing was introduced. The reason behind this idea was the limitation of resources available in every library in Indonesia, which includes : manpower, funds for acquisition of library materials, equipment and other facilities. It was felt necessary that a Network of Scientific Documentation and Information be set up, consisting of centres in specific subject fields. Initially there were four networks created :

- Science and technology.
- Agriculture and biology.
- Health and medicine.
- Social sciences and humanities.

Since then the idea of a library network has been adopted by other specific subject libraries and other types of libraries in Indonesia. In 1984 the National Library established a network with all Provincial Libraries in Indonesia to complete the link among libraries in Indonesia. Presently there are more than 20 established information networks in Indonesia. It has to be mentioned that these networks are still operating on a manual cooperative basis rather than a computer network.

The advent of information technology has given Indonesia the opportunity to enhance the existing networks using new technology, especially computer technology and telecommunications. During the FID/CAO 9th General Assembly and Congress in 1986, the Indonesian reported the efforts to develop IPTEKnet, a computer based network for science and technology information in Indonesia. Regretfully, IPTEKnet was not established until this year, when the study analysis of IPTEKnet was finally included in Science and Technology for Industrial Development (STAID), financed by the World Bank and administered by the National Research Council of Indonesia (DRN). A study of IPTEKnet has begun with consultation from the US National Research Council, Board on Science and Technology for International Development (BOSTID).

At the most recent Rakornas Ristek (an annual meeting at the national level to coordinate research and technology activities in Indonesia) it was agreed to appoint Indonesian Institute of Sciences (LIPI) as the secretariat of a National Committee for STI, which will be established by the Ministry Research and Technology. This committee will also have the task of formulating a national information policy in cooperation with other bodies related to information activities such as the National Library, Ministry of Education, Ministry of Agriculture, Ministry of Industry, etc.

The annual meeting also identified that in addition to bibliographic information, the following information is badly needed by science and technology community :

- Data on research and technology activities.
- Data on research and development manpower.
- Data on equipment and technical capability.
- Data on research and development product.
- Market information for R & D products.
- Information on research and development policies.

As an initial activity it was agreed to develop a database on information resources available within the science and technology community in Indonesia.

Related achievements

Other supporting achievements towards the formulation of the National Information Policy should be reported here , especially activities under the Ministry of Education.

In 1989, the National Library of Indonesia, which was previously part of the Ministry of Education, was promoted to a higher status and made directly responsible to the President of the Republic of Indonesia. The new organization includes the Centre for Library Development and 26 provincial libraries which were previously also part of the Ministry of Education.

In 1990, Parliament ratified a deposit law for publications and recordings. This law will support the function of the National Library of Indonesia as a deposit library preserving Indonesian publications at a national level, and the function of provincial libraries at a provincial level.

In 1987 a centre dealing with books and book publishing was established within the Ministry of Education. The main task of this centre is to undertake and give advice on book writing, translation, evaluation, selection, acquisition, production, and distribution, based on the policy of the Ministry of Education.

The status of librarians in governmental offices and institutions was enforced by a functional status, which provides clearer career development for government librarians. The new status of government librarians was officially declared by a decree from the State Minister for Administrative Reform in 1988. A joint letter from the Minister of Education and the Head of the State Personnel Administration Institute was published in 1988 to give guidance for implementation.

A concept of a national management information system has been developed within the State Ministry for Administrative Reform together with the State Secretariat. Undoubtedly this concept will influence the formulation of Indonesian information policy.

Conclusion

The issue of National Information Policy has been discussed often in Indonesia, however the formulation of the policy itself is still facing some difficulties. There are many institutions involved in information activities, which are scattered within many Government ministries. The situation made the establishment of an NIPB difficult and lengthy.

Activities aimed at the formulation of policies related to information were then undertaken according to the need of each ministry. Within the science and technology community, which is coordinated by State Minister for Research and Technology, it was agreed to set up a committee on science and technology information to formulate the much needed policy. Some separate policies related to information were created to answer the needs of each ministry. Those policies undoubtedly are important in the formulation of the national information policy. This National committee for STI, under the State Ministry Research and Technology, must work together with other institutions from different ministries to link existing policies which have already been adopted.

The National Information Policy in Japan

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Basic Government Policy Toward Effective Distribution of Scientific and Technical Information

Effective distribution of scientific and technical information (STI) is indispensable for the effective utilization of the results of research and development activities and also for creative and fundamental research work. Therefore, it is very important to establish an effective distribution system for STI. In 1984, the Subcommittee of STI in the Science and Technology Council submitted a report titled "Measures for Immediate Problems Dealing with the Distribution of STI." In this report, the subcommittee came up with the following four elements as the most essential and problematic:

1. The development of a database
2. A more efficient way in providing data
3. International cooperation
4. A further strengthening of the foundation of the overall system.

In March 1986, the Cabinet proposed the "General Guidelines for the Science and Technology Policy" and identified the distribution of STI as one of the most essential factors for the promotion of science and technology.

As for a concrete plan for the distribution of STI, the Science and Technology Council, responsible for the basic policies for science and technology in Japan, has already submitted "Basic Measures Dealing with the Distribution of STI" (NIST plan) as its 4th Report in 1969. In this report, the Council proposed an integrated nationwide network of STI centres, combining many information organizations on science and technology. Along the guidelines presented in the report, coordination of existing information organizations, a study on a database network and standardization of the information processing have been carried out through cooperation and coordination with the governmental ministries.

Policy-making and Coordination Mechanism

The Council for Science and Technology plays the most important role in the promotion of science and technology in the Government, whose members consist of the Prime Minister, the Minister of State for Science and Technology and the Minister of Education, etc., and also several scholars and men of experience. The council researches and proposes the basic policies for science and technology, wherein, some part is dedicated to the policy on STI such as, a guideline for future development and other important matters. The basic policy is implemented by each ministry or agency in its jurisdiction.

Guidelines for STI Activities in '90

Last December, The Council for Science and Technology investigated and established a basic policy for the infrastructure for promotion of science and technology, in which is included as the main part the policy for STI activities. When summarized here are a dozen of the items to be noted:

1. The need for STI increases very sharply in volume, speed and quality. Meanwhile, there are some disadvantages such as the difficulty in using DB due to overdiversification of the dissemination mode, and in some cases, channels of information flow are limited.
2. STI should be promoted on a NIST framework.
3. Bibliographic DB should be enhanced in coverage and more DB for grey literature should be constructed.
4. Construction and dissemination for factual DB should be promoted.
5. Standardization of STI should be more advanced.
6. A full-text DB should be developed.
7. Clearance for DB locations, research activities, etc. should be further enhanced.
8. Acquisition and collection, etc. of originals should be advanced more, especially for government reports, etc.
9. Networking between information processing/dissemination centres should be promoted and DB should be more widely disseminated. For this, integrated coordination is seen as being very important.
10. International networking is important for bidirectional flow of information, and construction of English DB of Japanese information, which is strongly needed overseas, should be more promoted.
11. Regional networking should also be developed.
12. The dissemination system should be developed to include such services as multimedia services, versatile and user friendly service, etc. through introduction of high technology.

Present Status of STI Centres in Japan

STI centres in Japan may be classified by their activities in the following way:

1. Comprehensive information centres

Two government organizations collect, process and provide the information for all fields of science and technology: The Japan Information Centre of Science and Technology (JICST, under the Science and Technology Agency) and the National Centre for Science Information System (NACSIS), under the Ministry of Education, Science and Culture.

JICST, a central organization for STI services in Japan, has been compiling and providing STI from all over the world (761,000 citations in FY 1989 of which 345,000 are domestic sources). It has started providing factual databases, with seven databases at present. JICST is financed by two income sources; namely, governmental support and service fees. NACSIS, a national inter-university research institute, was established in 1986 as the nucleus organization of scholarly information and provides the services of compilation, processing and dissemination of scholarly information including scientific and technological fields mainly for academic researchers. It is also conducting research and development activities concerning science information systems. NACSIS databases include union lists of approximately three million pieces of data from university libraries.

2. Specialized information centres

They collect, process and provide STI in particular fields. Most of them are governmental agencies in charge of those particular fields or non-profit corporations established under the supervision of the authorities. The following are the main organizations:

- Japan Patent Information Organization (JAPIO): patent information
- Small and Medium Enterprise Information Centre, Japan Small Business Corporation: technical information for small and medium enterprises
- Japan Pharmaceutical Information Centre (JAPIC): pharmaceutical information
- Japan Medical Abstracts Society (JMAS): medical information; JICST provides its information through an outline service system; a voluntary organization
- Agriculture, Forestry & Fisheries Research Information Centre, The Ministry of Agriculture, Forestry and Fisheries: agriculture, forestry and fisheries information
- International Medical Information Centre (IMIC): medical information
- The Japan Iron and Steel Technical Information Centre, the Iron and Steel Institute of Japan: iron and steel information
- Japan Association for International Chemical Information (JAICI): chemical information
- Japan Industrial Technology Association (JITA): MITI's patent license information

3. Collection, storage and dissemination centres

Libraries and JICST are the major organizations which collect and store primary information. According to the National Diet Library (NDL) Law, all unclassified publications (including grey literature) published in Japan are to be deposited in the NDL. The NDL develops databases of literature collected and provides it on magnetic tapes or CD-ROM's. It is also provided to public libraries using an on-line system.

University libraries are the major centres for the collection and storage of scholarly materials both domestic and foreign. Most of these libraries and JICST provide a copy service on request. According to the Copyright Law, only one copy of a part of a publication is permissible.

NACSIS has developed a database for holding information of scientific journals and monographs collected in the libraries of universities and major domestic research institutions through their mutual cooperation and also provides those retrieval services. Each university library collects, stores and provides those materials.

4. Database distributors

Besides, public organizations such as JICST or JAPIO, some private companies provide on-line services of scientific and technical information. Some others provide on-line services to domestic users as representatives for foreign on-line vendors such as DIALOG and BRS.

5. Information analysis organizations

The demand for information with a deeper analysis has been increasing and many information organizations provide such value-added information services. Besides, private think tanks and information brokers, organizations such as the Japan Small Business Corporation and regional information centres for small and medium enterprises provide very detailed technical and managerial information.

6. Clearing Houses

JICST provides an on-line service of on-going research projects carried out at public research institutes in Japan. The publication corresponding to this database, "Current Science and Technology Research in Japan" is also provided. JICST also has constructed a database for government reports, such as survey reports or research reports by municipal corporation and research reports of the projects funded by governmental organizations. NACSIS, on the other hand, develops a database of reported synopses of research projects conducted through research grant-in-aids by the Ministry of Education, Science and Culture and provides it on-line.

International Distribution and Cooperation

Foreign demand for Japanese STI has nowadays become very substantial along with the development of science and technology in Japan. For the continuation of international development of science and technology by promoting the international distribution of Japanese STI, we are presently working on and initiating a number of activities which are as follows:

1. STN International

JICST made an agreement with Chemical Abstracts (CAS) in the U.S. and FIZ Karlusruhe, a leading information organization in the Federal Republic of Germany, and started the operation of an international STI network called STN International in November 1987. Through this network, searchers can access any of the databases loaded at the three information organizations. JICST also is making efforts to enlarge the databases of the English version of Japanese literature to be provided through the network. It is also developing a machine translation system from Japanese into English. JICST has extended the JOIS service, which is its own on-line information service system, starting in 1976, for domestic users, to overseas markets from 1985.

2. International cooperation for the distribution of STI

Numerous international cooperative works concerning scientific and technical information have been carried out, including cooperation with the United Nations and the International Council of Scientific Unions. Japanese organizations providing domestic information for foreign countries, (including data entry services) are the following: the Patent Office; Agriculture, Forestry & Fisheries Research information Centre of the Ministry of Agriculture, Forestry and Fisheries; Japan Atomic Energy Research Institute (JAERI); the National Institute for Environmental Studies; Japan Oceanographic Data Centre; Meteorological Agency; Public Works Research Institute of the Ministry of Construction; and New Energy and Industrial Technology Development Organization.

JICST participates in the international medical information service activities which are led by the National Library of medicine (NLM), as an International MEDLARS Centre in Japan. JICST provides MEDILINE, TOXLINE and CANCERLIT through JOIS and/or STN. In addition, JICST participates in major international STI exchanges, helping to foster international cooperation. For example, it periodically provides free abstract journals in English on scientific and technical literature such as agriculture information to the member countries of the Association for Science Cooperation in Asia (ASCA).

NACSIS started an international network with the U.S. National Science Foundation (NSF) and the British Library for on-line database services and electronic mail services, corresponding tot the necessity for promotion of international information dissemination and the increasing need for international exchanges among researchers.

Formulating a National Policy on Library and Information Services in Malaysia

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Introduction

The value of information for overall national productivity and social, cultural and technological development is axiomatic and needs no justification. Hence there is a growing awareness among national governments to treat information as a vital national resource, and to initiate measures to ensure its effective management and utilization. This situation is leading to the formulation of national information policies and national policies on library and information services. The overall objectives of both these approaches are essentially the same: to bring about an improved information order, resulting ultimately in the establishment of more efficient, better coordinated, and more integrated library and information systems in the nation. This paper outlines the Malaysian approach to the formulation of a national policy for library and information services.

Objectives of a National Policy

In simple terms, a policy is "a plan of action", or "a statement of aims and objectives", providing a framework for the shape of things to come. Essentially, a national policy is also a pronouncement of the government regarding its perception and commitment towards the course of development in a particular sector.

Therefore, a policy is not an end in itself, but a means to an end. Viewed from this perspective, the objective of a national policy for library and information services is to provide a framework for a more planned and better coordinated development of the library and information infrastructure in the country, resulting thereby in an enhanced, user-oriented information service to the community. Hopefully, the process will also ensure more productive exploitation and use of information resources.

An indirect effect of a national policy is that it will serve as a supporting document to justify budgetary provisions for developments in the area of library and information services, in line with the stated policy.

UNESCO's Initiatives

UNESCO has played a prominent role in promoting the concepts of National Information Systems (NATIS) and National Information Policies since early seventies. Perhaps, it is relevant to briefly examine some of its initiatives in this direction.

In 1971 UNESCO launched the ambitious UNISIST programme or the World Science Information System, under the Division of Scientific and Technological Information and Documentation.

The stated objectives of the UNISIST programme were:

(i) Improvement of tools of systems interconnection;

(ii) Strengthening the role of institutional components of the information transfer chain;

(iii) Development of scientific information policies and structures (1)

Under the UNISIST programme, member states were called upon to establish national focal points and committees for the implementation of the programme.

Subsequently, in 1974, in a separate initiative, UNESCO promoted the concept of NATIS (National Information Systems), this time through its Department of Documentation, Libraries and Archives. The major thrust of NATIS was that it should constitute:

"All services involved in the provision of information for all sectors of the community and for all category of users. The task of NATIS is to ensure that all engaged in political, economic, scientific, educational, social or cultural activities receive the necessary information enabling them to render their fullest contributions to the whole community." (2)

The NATIS concept proposed a 12-point objective for national action:

(i) A national information policy.

(ii) Stimulation of user awareness.

(iii) Promotion of reading.

(iv) Assessment of user needs.

(v) Analysis of existing information resources.

(vi) Analysis of manpower resources.

(vii) Planning the organizational structure of NATIS.

(viii) Supplying manpower for NATIS.

(ix) Planning the technological needs for NATIS.

(x) Establishing legislative framework for NATIS.

(xi) Financing NATIS.

(xii) Universal Bibliographic Control (3)

UNESCO vigorously promoted both the UNISIST and NATIS programmes by issuing a series of guidelines and sending several missions to various countries. A number of member countries also set up national focal points and committees to participate in and plan for the implementation of UNISIST and NATIS programmes.

However in 1985, UNESCO, under the newly created Division of the General Information Programme (PGI), produced a new document entitled, "Guidelines on National Information Policy: Scope, Formulation, and Implementation." Interestingly, this document makes no reference to the earlier guidelines, and seemingly makes a fresh proposal of a four-part approach to the formulation of a national information policy:

(i) The scope of a national information policy.

(ii) Formulating a national information policy.

(iii) Implementing information policy.

(iv) National information coordination organization (4)

These separate initiatives of UNESCO do tend to present a picture of a lack of coherence and consistency on the part of this important international organization, with respect to its approaches towards matters of high importance like national information policy and national information systems. The situation has not entirely escaped the wrath of critics. It is not necessary to repeat these criticisms here as these have been documented elsewhere (5-7)

Notwithstanding this, it is relevant to make certain general comments regarding UNESCO's overall approach to the subject of national information policy and national information systems:

1. The UNESCO documents do not provide sufficient focus on the relationship between "policies" and "systems". Hence there is a failure to make a clear transfer from the policy formulation level to the systems planning level. This is crucial to the understanding of national information policy and national information systems. The NATIS documents tend to treat national information policy as a subset of the national information systems. The major emphasis of the PGI Guidelines, on the other hand, is on national information policy, which includes a section on "Implementing Information Policy", and totally excludes any reference to national information systems. Hence policy makers from a developing country may be excused if they are left in a state of near despair and confusion on how to approach the question of national information policy formulation and system design.

2. There is a preoccupation in the PGI Guidelines to establish strong justification and theoretical foundation for policy formulation. Hence it advocates the need for elaborate surveys, consultancy missions, data collection exercises, and international assistances, as a means of justifying the basic policy elements.

All these requirements may tend to make policy formulation a formidable exercise, particularly in the developing countries, which are meant to be the main beneficiaries of the UNESCO initiatives, because they may not have the necessary resources, capabilities and sheer stamina to undertake these tasks. Ironically, in the developing countries the management and use of the information resource is so backward that there is no necessity for elaborate surveys and consultancies to assess the true situation or to justify the need for specific policies for their enhancements.

3. The crucial question of what constitutes "policy" and how a policy statement is made are not clearly and functionally explained in the PGI Guidelines. The thrust of the document is largely concerned with developing justifications for the various elements of policy. In this respect the document fails to give proper guidelines on one of most crucial aspects of policy formulation.

4. There is also a failure to clearly and operationally define the meaning and scope of the term "information". The Guidelines use the term "information in an all encompassing manner to cover not only libraries and documentation centres, but a whole range of specialists involved in the process of generating and communicating information" (8). This may make the policy making process to be not only unwieldy, but it may also impinge on areas outside its scope of competence. Hence it may be more practical, at least in the initial stages to limit the scope of "information policy" to cover information resources as falling directly within the functions of libraries, documentation and information centres.

5. The Guidelines also propose the setting up of national focal points or a "National Information Coordinating Organization" (NICO), for the purpose of "policy formulation, the preparation of plans for its implementation and the coordination of operational activities involved in the execution of the plans" (9). The wide range of functions, including inter-departmental coordination, assigned to NICO provides for a rigid and highly structured mechanism. Coordination of activities among various departments and agencies is not easy as each department is extremely jealous of its authority and responsibility, and is not likely to easily submit to any centralized coordination, unless this is provided for with appropriate legislation. Such legislation is not easy to justify, unless for extremely important matters, such as national security. It is a reality that, in many developing countries, matters pertaining to libraries and information services are yet to acquire such high priority status.

Under the circumstances it may seem prudent for any coordination, at least at the initial stages, to be conducted in a less "structured" or " ad hoc" manner, through the leadership of an organization which performs a dominant function with respect to library and information services. In addition, an inter-departmental committee may be formed comprising those agencies playing an active role in the area of library and information services. The mechanism may be progressively evolved into a more formal coordinating body, as the need for more structured coordination becomes generally accepted.

It appears that the need for a centralized coordination becomes generally acceptable when library and information service organizations achieve a high state of development. In Britain, for instance, initiatives for such a mechanism began only in 1979, (10) and in the United States in 1975 with the formation of NCLIS (11).

In developing countries where the priority is for speedy development of library and information services at the present time, a move towards central coordination may become counter-productive.

Notwithstanding the above comments, it should be recognized that UNESCO's commitment and initiatives towards the promotion of national information policies and systems are valuable, and should be used to complement and support national efforts in these directions. However, it should be understood that the actual formulation of any national policy and system should be a national effort, undertaken within the context of the socio-economic, technological and bureaucratic systems prevailing in the country. Consultants and experts from foreign countries and even UNESCO might be able to provide, at best some guidelines, but they will not possess the competence to do the actual work, which is indeed the perogative of the local people.

Malaysian Approach to Formulating a National Policy for Library and Information Services

The first Malaysian approach to the subject of national information policy was its involvement in 1977 with the concept of National Information Systems (NATIS). A Preparatory Committee to plan the National Information System was established with the following terms:

(i) To plan for a Malaysian National Information System based on the concept of overall planning and coordination and for such purpose:

(a) to study the objectives proposed by UNESCO for implementation at national level;

(b) to consider those objectives as may be implemented and to establish priorities.

(ii) To propose such measures as necessary for the implementation of the above, specifying administrative and financial implications (12).

The Preparatory Committee set up Working Committees and sub-committees to study:

(i) User needs.

(ii) Manpower resources.

(iii) Organizational structure.

(iv) Technological needs.

(v) Legislative framework.

All these efforts came to naught, as explained by Dr. Wijasuriya, the Chairman of the Working Committee, and the then Deputy Director General of the National Library of Malaysia:

> *"Despite the fact that these sub-committees and working groups put in a great deal of useful work, it has become quite apparent that most of the tasks envisaged are long term ones, requiring considerable input in terms of manpower and finance and hence cannot be executed effectively by existing institutions or serving officers, burdened as they are with their normal duties and responsibilities"* (13).

The next phase was an earnest effort to formulate a National Policy for Library and Information Services, which began in 1982 when the author succeeded in obtaining a grant of US$ 9000 from UNESCO under its PGI to organize a seminar with the objective of formulating such a policy. UNESCO also approved a consultant mission under this arrangement and nominated Mr. John Gray from Britain for this purpose. Mr. Gray made a preliminary visit in August 1983 and during the Seminar which was held on 29-30 October 1984 (14).

The objectives of the Seminar were:

(i) To analyse issues and problems relating to libraries and information services.

(ii) To identify major elements for incorporation in the proposed national policy for libraries and information services.

(iii) To evolve a coordinating structure for libraries and information services.

The seminar was attended by 120 participants comprising senior officials from libraries, government agencies and private sector organizations. A total of 11 working papers were presented by professionals and specialists in the field of library and information services, on themes which were of particular relevance to the overall objective of the seminar:

(i) Towards wider reading: the materials and methods.

(ii) Improving access to information: problems and methods.

(iii) Technological inputs in information work.

(iv) Financial and manpower bases of information work.

(v) Towards a coordinated administrative framework.

(vi) Elements for national policy for library and Information services.

The Seminar did not result in the formulation of a national policy for libraries and information services, as it was realized that policy formulation is an involved and meticulous process which requires a longer period of time for completion. The major contribution of the seminar, however, was that it served as an important first stage in the identification of issues, problems and elements for incorporation in the national policy. Another significant outcome was the establishment of a Task Force on 16 November 1984 at the National Library, with the concurrence of the Ministry of Culture, Youth and Sports, to formulate a National Policy on Library and Information Services. The Task Force completed the final draft of the National Policy only in early 1987. The policy was finally approved by the Government on June 1989. For a fuller account of developments up to the stage of completion of the final draft of the national policy the reader is referred to "Formulating a National Policy for Library and Information Services: the Malaysian Experience" (15).

The full text of the National Policy on Library and Information Services is given in the Appendix.

Basic Principles in Policy Formulation

The Task Force adopted certain basic principles and procedures in formulating the national policy for library and information services. Some of these are as follows:

1. It was decided to depart from the UNESCO guidelines in terms of the scope of the policy. UNESCO advocates a generic all encompassing, "National information policy". The Task Force however, decided that in order to make the policy more meaningful, practical and relevant to the overall Malaysian context, it should be called, "A National Policy on Library and Information Services".

2. In drafting the policy, the Task Force took note of several UNESCO guidelines, and the inputs from the seminar. However, it decided to do away with the need for various surveys and data collection exercises, recommended in the UNESCO guidelines in order to provide the necessary rationalizations. The decision was partly influenced by an earlier negative experience in trying to accomplish similar tasks while trying to implement the NATIS concept in 1977, as explained earlier. In addition it was felt that the weaknesses in the management of the information resources were obvious,

and there was general recognition of the need to upgrade the library and information services so as to ensure the more effective use of information as a national resource.

3. The Task Force clearly defined the meaning and nature of policy statements. It was recognized that a policy statement in the present context is essentially a pronouncement of the government regarding its commitment to, and perception on, the course of development envisaged for the library and information sector. It is not to be seen as a directive or a proposal from the profession to the Government. The policy statements must be generic, dignified and precise pronouncements of principles which will provide scope for programme developments in a progressive and flexible manner and in accordance with the changing environment.

4. The Task Force also decided that considering the responsibilities for library and information services are spread over a number of organizations, departments and agencies, it would not be prudent at this juncture to recommend a highly "structured" national information coordinating organization or a similar body. It was decided to leave the coordinating function for the present to be performed by the National Library of Malaysia.

5. The National Policy on Library and Information Services, therefore, is a brief document of six pages comprising five sections:

   (i) Introduction.

   (ii) Scope.

   (iii) Objective.

   (iv) Strategy.

   (v) Implementation.

Conclusion

The National Policy on Library and Information Services is essentially an outcome of indigenous effort and approach in Malaysia. A unique feature of this policy is the simplicity with which it is expressed. Viewed from the background of the series of UNESCO guidelines and the latest work by John Gray, "National Information Policies: Problems and Progress" (16), all of which tend to perceive policy formulation as a tedious and elaborate exercise, which must be supported by extensive data and guided by a number of UNESCO missions, the Malaysian Policy may appear to be an anti-climax and over- simplification. The Policy also does not strictly adhere to the procedures, methodologies and structure provided in the UNESCO guidelines. However the major policy elements identified in these documents have been incorporated.

The Malaysian approach and the structure of the Policy may draw criticism from certain quarters. However, the formulators need not make any apologies for their particular approach, and may feel satisfied that the Policy has been constructed to reflect the requirements of the Malaysian context. The rather unique Malaysian approach may further emphasize the fact that the formulation of a national policy should be the result of national effort, and not the

perception of foreign consultants who might not have an intimate understanding of the socio-economic, technological and bureaucratic context of the nation. It is hoped that the Malaysian experience will contribute, even in a minute way, towards a better understanding of the problems, challenges and methodologies relating to the formulation of a national policy for library and information services.

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Appendix

National Policy on Library and Information Services

1. Introduction

The National Policy for Library and Information Services sets out broad guidelines for the systematic and planned development of library and information services in keeping with the needs of major sectorial areas as well as the needs of all sections of the community whether in the urban or the rural areas. The National Policy for Library and Information Services has been formulated taking into consideration the infrastructure of library and information services provided in the country at the present time as well as the legislation enacted for the establishment of the National Library of Malaysia, the State Public Libraries and for the legal deposit of library materials.

2. Scope

The scope of library and information services is deemed to cover the acquisition, organization, management and dissemination of library materials and the information contained therein. Library materials include any form of printed, graphic, audio, electronic or other media on or in which information is written, recorded, stored, displayed or produced and is categorized for purposes of the Deposit of Library Material Act 1986 into:

(a) Printed library material including books, serials, maps, charts, posters.

(b) Non-printed library materials including cinematograph films, microforms, phonorecords, video and audio recording and other electronic media.

3. Objective

In consonance with the Government's objective to create a reading and informed society, the National Policy for Library and Information Services aims at the provision and progressive improvement of library facilities and services in order to contribute effectively to national development and provide, in particular, effective support for:-

3.1 The policy formulation and decision making process.

3.2 Planning, research and development activity.

3.3 The educational process.

3.4 The intellectual development of the people, their economic activity and the fulfilment of their cultural and recreational needs.

4. Strategy

In order to achieve policy objectives the strategies for library development are as follows:

4.1 Appropriate library and information services commensurate with needs shall be provided:

4.1.1 To serve Parliament, Government Ministries and Departments, research, institutes, universities, colleges and tertiary education institutions and schools.

4.1.2 In every district and mukim within the country in such manner that those desirous of using such facilities will have convenient access to them.

4.1.3 To serve the under privileged and handicapped members of society.

4.2 In order to provide library and information services commensurate with needs, library materials produced within the country as well as abroad shall be acquired in accordance with national standards of provision, giving due consideration to the need to minimize unnecessary duplication of resources.

4.3 Publishers in the private and public sectors shall be encouraged to substantially increase their publications in all fields and to suit all interest levels in accordance with the basic tenets of the National Book Policy.

4.4 Library and information resources and facilities provided by agencies in the public sector are part of overall national provisions for the people and shall be made easily accessible subject to priority access that may be accorded to the primary clientele.

4.5 In the provision of library and information services, special emphasis shall be placed on the sharing of resources in order to maximize benefits from the investment of public funds. For this purpose, computer, micrographic, telecommunication and other appropriate technologies shall be fully exploited. In this regard, telecommunication developments shall be provided adequately for the data communication needs of libraries and information services.

4.6 As part of the intellectual and cultural heritage of the nation, all library materials published or produced within the country shall be deposited and conserved in accordance with legislative provisions in force and made as accessible as possible.

4.7 In order to provide for the effective use of library materials, library and information services shall provide, as appropriate:

4.7.1 Proper documentation of their resources in conformity with national standards, so as to facilitate the creation and maintenance of an integrated national data base.

4.7.2 Access to computerized data bases at a national and international level.

4.7.3 Lending, reference, referral, information analysis and consolidation, bibliographic, selective dissemination and document copying facilities.

4.7.4 User education programmes so as to create an information conscious society; to increase user awareness and appreciation of the importance of information and to enable users to derive maximum benefit from the use of library materials.

4.7.5 Programmes to inculcate and encourage the development of the reading habit.

4.8 In order to reduce the nation's dependence on external sources of information, effective measures shall be taken:

4.8.1 To exploit national sources of information and develop national data bases, particularly in major development sectors.

4.8.2 To establish specialized information centres and systems in areas deemed to be of national importance.

4.9 In order to provide the professional manpower to facilitate the nation-wide development of library and information services, measures shall be taken to:

4.9.1 Provide library education and training facilities within the country at the tertiary level.

4.9.2 Produce the required manpower with the appropriate qualifications, knowledge, attitudes and skills.

4.9.3 Provide for the further exposure and continuing education for professional personnel.

4.9.4 Provide for the staffing of library and information services in keeping with national norms and standards.

5. Implementation

The progressive improvement of library and information services will necessitate effective mechanisms to initiate, coordinate and monitor the implementation of policy. In this respect, the National Library Act provides adequate provisions at the present time. The effectiveness of these mechanisms shall be reviewed and new provisions made should this be necessary.

Papua New Guinea - Case for a National Information Policy?

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Brief History

1526/27: Don Jorge de Meneses, a Portuguese navigator sights the country and calls it Papua - 'woolly-haired' people.

1884: The British East India Company takes possession of the country.

1885: Germany annexed the northern half of the country - New Guinea. Agreement with the Dutch and the British over ruling.

1906: Papua becomes Australian Territory.

1914: World War I, Australian troops take New Guinea.

1920: League of Nations officially puts the country under the Australian Government. Becomes a "Crown possession" by the Papua and New Guinea Act of 1949-1968".

1942: Japanese invasion, World War II.

1944: Allied troops re-take country.

1945: Australia takes control again.

1968: First House of Assembly.

1973: Internal Self Government.

1975: Independent Nation from Australia with Constitution.

1978: Decentralization, introduction of provincial governments.

Government

Type: Parliamentary Democracy.

Self-Government: December 1, 1973.

Independent: September 16th, 1975.

Constitution: September 16th, 1975.

Flag Colours: Red, Black, Gold, White

Executive:
Head of State: Queen Elizabeth II represented by the Governor General
Head of Government: Prime Minister.

Legislature:
Unicameral; 109 Members of Parliament.

Judiciary:
Supreme Court; National Court based on the English Common Law.

Major Political Parties:
Pangu Pati; Peoples Progress Party; Melanesian Alliance; Peoples Action Party; Melanesian United Front; League for National Advancement; United Party; National Party; Papua Party.

People

Nationality:	Papua New Guinean.
Population:	3,006,799 (1980 Census); 7.4 million expected by 2015.
Annual Growth Rate:	2.3%.
Ethnic Groups:	Melanesian, Australian, Chinese, Others.
Religion:	Christian and Animist. More than half are nominally Christians; Catholic, Lutheran, Protestant .

Geography

Area:	178,260 sq. miles.
Capital City:	Port Moresby.
Other Major Towns and Cities:	Lae, Rabaul, Madang, Goroka.
Climate:	Wet and dry, tropical monsoon.

Education

Not compulsory. There are three types of educational systems: PNG Government, Church agencies and the International Education Agency schools. All students sit for the same examinations in Grades 6 and 10.

School entrance is at the age of 7, with 6 years of community/primary school education, 4 years of high school i.e. Grades 7-10, then either Grades 11-12 or into vocational or other career institutions. The drop out rate is quite high, either through socio-economic and political pressures or lack of academic ability. There are two major universities - University of Papua New Guinea in Port Moresby with faculties of Arts, Science, Education, Medicine, Creative Arts, Law and Goroka Teachers College; the University of Technology in Lae has 14 Departments (as opposed to faculties) in Accountancy and Business Studies; Architecture and Building; Applied Sciences; Forestry; Civil Engineering; Mechanical Engineering; Surveying and Land Studies; Agriculture.

Languages

There are more than eight hundred languages with three major lingua franca, i.e. Tok Pisin, Hiri Motu and English. English has been the major medium of instruction until this year when Cabinet endorsed the Literacy Awareness Program, where the mother tongue or the vernacular language should be the first language used in a child's education. The estimated illiteracy rate for 15 years and over for 1990, according to UNESCO, is 48% (1).

Budget

(1990): K1.2 Billion (Deficit of K52 million)

The Government has adopted the system of program budgeting to allocate budgetary funds to specific operations to meet national objectives, which have been identified in the light of sectorial policies. This is also a means of measuring efficiency in governmental operations.

1990 Estimates of Revenue and Expenditure for the Year Ending 31st December, 1990

Departments (Sectors)	Appropriations	
	1989	1990
AGRICULTURE AND LIVESTOCK (pb)	41,688.0	35,562.7
CIVIL AVIATION (tb)	23,012,200	26,343,100
COMMISSION FOR HIGHER EDUCATION (tb)	4,831,600	5,446,100
CORRECTIONAL SERVICES (tb)	12,272,500	13,913,300
DEFENCE (tb)	40,859,500	43,176,700
EDUCATION (tb)	47,069,700	52,578,800
# Provincial Literacy Program.	230,000	229,600
ENVIRONMENT AND CONSERVATION (tb)	3,098,900	3,437,900
FINANCE AND PLANNING (pb)	18,825.2	21,600
* Statistical Services	2928.1	5352.6
# Production & Publication of National Statistics	1300.1	1301.7
# Population Census Operations	1628.0	4050.9
* IT & Computer Services	2513.9	2393.7
# Provision, coordination & standardization of Comp. Serv.		
FISHERIES AND MARINE RESOURCES (tb)	6,479,600	4,768,300
FOREIGN AFFAIRS (tb)	10,750,000	11,143,400
FORESTS (pb)	5,793.5	5,961.6
HEALTH (pb)	44,474.5	46,619.8
HOME AFFAIRS AND YOUTH (tb)	3,988,700	5,397,000
TRADE AND INDUSTRY (tb)	2,822,100	3,537,900
JUSTICE (tb)	9,815,600	9,002,800
LABOUR AND EMPLOYMENT (tb)	2,695,700	2,506,700
LANDS AND PHYSICAL PLANNING (tb)	11,010,100	10,155,400
MINERALS AND ENERGY (tb)	10,932,800	8,732,300
PERSONNEL MANAGEMENT (tb)	20,459,200	18,615,000
POLICE (tb)	42,597,400	44,784,400
PRIME MINISTER & NEC (tb)	5,987,400	5,958,400
PROVINCIAL AFFAIRS (tb)	5,704,100	4,965,600
TRANSPORT (tb)	12,826,700	9,320,200
WORKS (tb)	6,613,900	10,330,300

pb: program budgeting tb: traditional budgeting

Departments (Sectors)	Appropriations	
	1989	1990
STATUTORY AUTHORITIES	41,873,600	33,031,600
IASER	1,022,700	1,038,900
NBC	7,498,700	7,996,800
Nautical Training Institute	479,000	478,600
National Tourist Corporation	2,636,100	1,988,100
SPECIAL APPROPRIATIONS (Charged Expenditure)		
University of PNG (Main Campus)	13,030,600	14,082,500
Medical College	2,424,800	2,151,200
Goroka Teachers' College	2,754,600	2,708,900
National Arts School	901,600	996,400
University of Technology	13,045,000	14,896,600
PROVINCIAL DEPARTMENTS		
Western Province	10,291,200	10,469,100
Gulf	6,643,200	7,572,600
Central	9,612,200	9,422,400
Milne Bay	9,900,500	11,417,800
Oro	6,710,600	7,131,100
Southern Highlands	13,268,700	14,159,300
Enga	10,451,700	10,731,800
Western Highlands	13,048,000	15,318,100
Simbu	9,665,000	11,869,200
Eastern Highlands	4,662,600	6,438,100
Morobe	4,159,000	4,938,600
Madang	4,037,200	4,283,500
East Sepik	5,379,600	4,253,700
Sandaun (West Sepik)	2,409,300	2,230,900
Manus	4,259,200	4,440,400
New Ireland	1,702,300	1,914,600
East New Britain	4,016,100	4,288,500
West New Britain	2,431,700	2,378,700
North Solomons	3,180,400	3,234,400

Communication Infrastructure

Television

EMTV (partial national ownership, programmes decided by parent company in Australia) Television was introduced in mid 1980's though it was available before this in the country via satellite from Australia and Malaysia. Television receivers in PNG: 1.9 per 1000 (1).

Radio

Radio receivers in PNG: 64 per 1000 (1) . This figure is only an estimate. The actual figure could be higher, as more and more people are buying radiocassette players.

The National Broadcasting Commission

Radio broadcasting was introduced in Papua New Guinea in 1934 by the Amalgamated Wireless of Australia (AWA) and was discontinued around 1939 due to the Second World War. It resumed the service as a joint exercise of the Australian Broadcasting Commission (ABC) and the Allied Forces, running 9PA in 1944. The ABC took over responsibility in 1946 providing a service which catered for the expatriate minority.

In 1961, the first Government broadcasting station was opened in Rabaul thus paving the way for other stations to be established in major provincial headquarters.

The National Broadcasting Commission (NBC) was established in December 1973 by the Broadcasting Commission Ordinance 1973 - (No. 78 of 1973).

NBC took over the operation of the Papua New Guinea Branch of the ABC and the broadcast functions of the then Department of Information and Extension Services (DIES).

In October 1966, the first Broadcasting Development Plan proposed expanding the ABC service by providing Medium Frequency ground wave services to five major towns i.e. Wewak, Madang, Goroka, Lae and Rabaul. These transmitters were installed in 1972. An additional high frequency transmitter to the already existing three was not installed due to the doubtful future of the transmitting station at Waigani.

However, two low powered (2KW) high frequency Tropical Broadcasting band Transmitters in each Province with associated studios was completed in 1973.

In 1975, Year of National Independence, NBC prepared a Development Plan for Radio broadcasting in Papua New Guinea covering 15 years. After UNESCO's appraisal, a final draft of the plan was discussed with the National Planning Office (NPO), the Department of Finance and other government departments and agencies.

The functions of the Commission in the Ordinance state that: "it is the duty of the Commission to provide balanced, objective and impartial broadcasting services with and, if so directed by the Administrator in Council, outside Papua New Guinea, and in so doing to take, in the interests of the community, all such measures as, in the opinion of the Commission, are conducive to the full development of suitable broadcasting programmes.

In particular, the Commission

(a) Shall ensure that the services that it provides, when considered as a whole, reflect the drive for national unity and at the same time give adequate expression to the culture, characteristics, affairs, opinions and needs of the people of the various parts of Papua New Guinea and in particular of rural areas.

(b) Shall do all in its power to preserve and stimulate pride in the indigenous and traditional cultural heritage of Papua New Guinea.

(c) Shall take extreme care in broadcasting material that could inflame racial or sectional feelings.

(d) Shall co-operate with the Government in broadcasting social, political and economic extension programmes and educational programmes.

To maintain the above, the Government from time to time advises the Commission of its policies and priorities.

The National Broadcasting Commission offers three major services:

Kundu - basically a service to eighteen provinces in the country operating exclusively in high frequency bands with emphasis on developmental educational and extension programmes. Broadcast languages used are English, popular lingua franca and or vernacular of the province, e.g. Radio Central - languages would be English, Hiri Motu;

Radio East New Britain - English, Tok Pisin and Kuanua; Radio Guld - English, Hiri Motu and Toaripi.

Karai - a service primarily directed at educated Papua New Guineans who are now, or who are expected to be , in positions of leadership in their own communities at provincial, sub-district and village levels, and who need to know what is happening all over the country. Programmes include entertainment and educational of a national character plus Parliamentary broadcasts, forum discussions and live broadcasts of significant events. Broadcast languages are English, Hiri Motu and Tok Pisin.

Kalang - this service replaced what was known as the National Service and is primarily aimed at the elite urban audience with a leaning towards student and functionary audiences especially the younger generation. Major broadcast language is English though Tok Pisin and Hiri Motu are used depending on the content of the message. It is the only radio service carrying commercial advertising, though it is anticipated that revenue from this will not cover all operating costs.

Major problem areas for radio broadcasting are in the physical and transmission facilities, which are long overdue for a major overhaul. Reception needs to be improved drastically especially when little villages like Delena in the Central Province can pick UP Radio Australia very clearly while the transistor has to be slapped and banged to get a better reception for the Karai service.

Despite this, NBC radio services provide the only information services - though largely one way - to the whole of Papua New Guinea.

- Newspapers
- Daily newspaper circulation per 1000 inhabitants: 13 (1).
- Post Courier (Daily)

Audited circulation: 36,000 daily to all 19 Provinces in the country with a readership figure of 200,000 each day. Port Moresby - 16,000; Lae: 10,000 and the remainder up to 1,000 or less. Mode of transportation of the paper is via normal Air Niugini routes, Talair where Air Niugini does not fly and special charter by Milne Bay Air to Lae, the second largest city in Papua New Guinea. (Information provided by the Chief of Staff, Blaise Nangoi).

Times of Papua New Guinea (Weekly)

One of four newspapers (Trade Monthly, Wantok and Weekend News, and Times of Papua New Guinea) owned by Word Publishing Company. The main shareholders of which are the Catholic, Lutheran, United and Anglican Churches. The churches provide funds to run the organization whilst the newspaper has their own independent editorial policy. Weekly average circulation figures are as follows: Times of PNG - 5,667(E); Wantok - 11,219(E,TP); Weekend Sport - 5,684; Trade Monthly - 8,200+(per month). (Information provided by Acting Editor, Bernard Maladina).

Post and Telecommunications Corporation

The Department of Posts and Telegraphs (P&T), as it was then called, was established on July 1, 1955, though it began its first postal services as early as 1885, with the first telephone exchange introduced in Rabaul in 1907 and a 100 line exchange in Port Moresby in 1910. In 1913, wireless telegraphy was officially introduced into the country. By 1966, there were 33 telephone exchanges, a poor trunk line system, telegraph facilities and a high frequency double side-band radio outstation network. The postal network consisted of 28 official post offices and 52 agencies. By mid 1972, 33 automatic and 9 manual telephone exchanges throughout the country were established. In 1975, Posts and Telegraphs became Postal and Telecommunication Services under the Department of Public Utilities and had a staff of 2,186 in 111 postal outlets throughout Papua New Guinea. In October 1982, the Postal and Telecommunication Services achieved statutory Corporation status as Post and Telecommunication Corporation (PTC).

About 100 microwave bearers provide a telecommunications network through 50 exchanges servicing some 27,000 subscribers. For subscribers beyond the reach of the exchanges, a high frequency (HF) service exists through a radio service. Some 125 submarine circuits and 74 satellite circuits through an earth station at Gerehu, the largest populated suburb in PNG, provide for overseas calls.

There is a telex network of 1,300 subscribers with one telex exchange at Lae and a concentrator at Port Moresby. For the business community, 550 data circuits are provided.

A Coastal Radio Service and Spectrum Management functions produce some revenue.

In 1989, over 31,000 telephone services were connected to the PTC network, 35 million mail items were handled through the postal network, 350,000 Salim Moni Kwik transactions took place and PTC is now offering international toll free service for its business customers. The international network is maintained through agreements with member countries of the Universal Postal Union (UPU).

Air transport is the major mode of transportation for the majority of postal services .
(Infc.mation supplied by Neville Togarewa, Publicity Official, PTC)

Library and Information Work in PNG

Chronology of libraries and library related developments:

1875: Missionary printing - Lawes.

1887: Reading Room (attached to the Government House).

1888: Government Printing Office established

Pre 1914: Small collections may have existed in homes and offices on plantations and in private and government offices.

1914: The Library Institute Hall was opened by the Governor on November 30th.

1926: "The concrete structure for the Library Institute Building was completed", located in Douglas Street, Port Moresby. Lieutenant Governor Hubert Murray on invitation by the Choral Society became the patron of the Institute and donated fifty of his books to the library. The then Governor's Secretary, Mr. A. M. Campbell gave 167 books including many valuable volumes about New Guinea. The Library Institute building contained three rooms: a billiard room, a library and a reading room.

1936: The Commonwealth of Australia's National Library established the Public Library Service of the Territory of Papua and the Mandated Territory of New Guinea.

World War II: Library development stopped short.

Post-War administration took over library services which had been maintained by private subscriptions. New public library found a home in an annexe in the Wartime Officers Club on Ela Beach which was burnt down in 1987/88.

1947: Public Libraries re-established by the Department of Education.

1949: Village Library Scheme.

1949 - 62: Country became the Territory of Papua and New Guinea. Experimental village libraries established by the Department of Native Affairs' Welfare and Development Division.

1962: Department of Information and Extension Services abolishes the experimental village libraries. "At one point, almost 260 libraries existed each consisting of books in "English provided as expendable items".

1963: Establishment of the Administrative College Library; Public Library Service course begins.

1966: University of Papua New Guinea Library renamed in 1986 as the Michael Somare Library.

1968: Matheson Library at the University of Technology. Formal library training begins at the Administrative College with the Library Assistants' Course.

1970: Library Officers Certificate starts at Adcol.

1972: Tok Tok Bilong Haus Buk gets started as the journal of the PNG Branch of the Library Association of Australia, later to be known as the journal of the Papua New Guinea Library Association.

1972-74: Goroka Teachers College ventures.

1973: Self-government for Papua New Guinea.: The Papua New Guinea Library Association is formed.

1975: Papua New Guinea gains National Independence from Australia. PNG National Executive Council approves the Inter-departmental Committee Report in January for the establishment of a National Library Service. Library Council of Papua New Guinea.

1978: Mr. Gough Whitlam officially opens the National Library Building, an Independence Gift from the Australian Government. Decentralization of Public Libraries Introduction of the Diploma in Library Science course at the Administrative College.

1978-81: Library Assistants - Library Officers.

1982: Merging of the Library Assistants' and Library Officers' Courses to the Library Technicians' Certificate Course.

1986: Book Council of Papua New Guinea.

1987: BLIS(UPNG) earlier attempts at degree in 1971, 1977, 1979, 1983 Transfer of Library Studies section to the Department of Library and Information Studies.

1988: December 31st, completion of Transfer to UPNG.

1989: January 1, the function of Library Studies Section of the Administrative College is transferred to the University of Papua New Guinea's Faculty of Education after the IDRC sponsored consultancy by Prof. Pauline Atherton-Cochrane. Courses at UPNG: Diploma in Library and Information Studies, Bachelor in Library and Information Studies and the Library Technicians' Certificate. Caris centre opened in the Department of Agriculture and Livestock Library. ASTINFO established with the National Library of PNG.

1990: NEC approves the Literacy Awareness Programme Inauguration on April 5th at the National Library CARIS closed due to lack of funds and has been opened after some explanations to the DAL of the importance of CARIS. APINESS established at the University of PNG within the Arts Faculty. Dr. Donald Wijusuriya consultant for a National Library and Information Policy for PNG. Seminar to be held early next year to discuss this policy.

Types of Library and Information Units in PNG

National Library: National Library of Papua New Guinea.

Public Libraries: There are about 18 or 19 Provincial Libraries in main provincial centres and three under the direct governance of the National Library in the National Capital district. The National Library gives advisory service and some training in the form of library attachment at the National Library for provincial library staff.

Community Libraries: These are not so common, though there is a need for the existence to serve individual community needs. For example SIL Community Library serves the Summer Institute of Linguistics community at Ukarumpa, Eastern Highlands Province.

Academic Libraries: Those of universities, teachers colleges, institutions of higher education e.g. Michael Somare Library at the University of PNG (Port Moresby); Matheson library at the University of Technology (Lae); Administrative College Library serves the needs of government personnel being trained at the College; Medical Library branch library of the Michael Somare Library for the Medical Faculty; Pacific Adventist College Library is a private institution of the Seventh Day Adventist Church. Bomana Police College Library.

Special Libraries: (governmental or private enterprise such as industrial/commercial libraries and research libraries). Department of Agriculture and Livestock Library; Institute of Applied Social and Economic Research Library - a semi-governmental library); Ok Tedi Mining Limited Library.

Research Libraries: Institute of Applied Social and Economic Research Library Medical Library; Michael Somare Library especially the Science Faculty; Bank of PNG Library; Post Courier Newspaper Library.

Departmental Libraries can also be called special libraries as they serve the information needs of the parent department in which they are housed e.g. Attorney General's Department Library formerly the Justice Department Library; Forests Library. Nearly all government departments and statutory organizations have their own libraries or information centres.

School Libraries: (those in PNG Curriculum system and those under the International Education Agency (IEA) system). Those under the latter system have better equipped libraries and resources centres than their counterparts in the PNG education system especially in the community schools e.g. there is not one single community school in the country with what you can call as a good school library.

St Joseph's International Primary School Library and Port Moresby International High School Library (IEA schools);

St Peter Channel Community School Library; Gerehu Provincial High School Library; and Sogeri National High School Library (PNG schools).

Publishers

Government:-
Government Printing Office.
Departmental Printing.
Statutory Bodies e.g. UPNG, IASER

Major problem areas are that of control of what is being published and/or what is available, and the lack of a government distribution centre.

Private: these are basically small commercial enterprises e.g. PNG Printing, Hebamo Press in Port Moresby; mission publishing houses, e.g. Summer Institute of Linguistics, Ukarumpa and Christian Books Melanesia which also have a small bookshop outlet for their materials.

Transport Infrastructure

The network of road, sea and air services according to Government objectives, will enable the productive sectors to realize their potential, and thus link the people to basic social services such as heath, education and marketing outlets. In so doing, the Government will ensure safety standards at the national and international levels.

No major roads link up Port Moresby, the capital city in the Southern Region, with major towns in the northern part of the country.

The Government has the objective of maintaining and expanding roads and bridges and other physical infrastructure for the supply of goods and services to all people, especially in the rural areas.

Port Moresby, Lae and Rabaul are within international shipping routes and mission and private coastal vessels provide transport and communication links where road and air transport is not possible.

Civil Aviation's objective is to promote an efficient air transport system whilst maintaining international and safety standards. The new Civil Aviation policy of 1989 looks at promoting and creating revenue for the nation.

Air Niugini is the nation's airline which has online and facsimile facilities for all its offices. Talair, a third level , privately owned airline operator, has similar facilities. Other airline services are either mission owned e.g. Mission Aviation Fellowship, Summer Institute of Linguistics, or privately owned e.g. Nationair, a nationally owned company and the mining companies such as Ok Tedi Mining Limited.

Communication is brought by air services to most people throughout the country.

Papua New Guinea - Case for a National Information Policy?

No policy whether for governmental, institutional or personal reasons should be written in isolation from its social, economic or political environment. An adequate knowledge base for the development of informed public policy is very essential (2).

Policy is "a statement of a specific goal or goals which are to be achieved, or to be pursued, a statement of the means by which realization of the goals will be brought about, an assignment of the responsibilities for implementation of the means and a set of rules or guidelines regulating the activity" (3). "Policy by itself will have little effect if it is not backed by the necessary allocation of resources, both human and material. The policy therefore, if approved, will have to be well publicized and widely disseminated." (4).

On the question of an information policy, Judge states that: "An information activity has the best chance of success when it is linked to a major programme which Government advocated for its own sake: industrial development, health, or environmental protection. Government support of its priority programmes in whatever fields still offers the best bandwagon to which we can hitch our commitment to the importance of information in today's society" (5).

Lundu also supports this belief: "a national information policy should indeed be integrated into the totality of national development policies, plans and programmes at institutional, sectorial and national level" (6).

He then adds that: "A NIP must embrace all kinds of sectorial and national policy areas such as: economic policies, education, technology, cultural and even research policies" (6).

Macdonald's basic goals for a national information policy are "to protect the existing service and resource base; to enhance the service and resource base; to change services, methodologies, opportunities and circumstance as required in order to increase our effectiveness and our efficiency" (6).

The Hon. Paul Hasluck in an address to the William McGregor Club in Sydney, on 20th November, 1951 on "A policy for New Guinea" clearly points out that any policy made for whatever purpose should not be so rigid as to be inflexible and unchangeable with the times (7).

The Papua New Guinea Situation

Papua New Guinea is going through changes that are not dissimilar to those experienced by United Kingdom or the United States of America not so long ago. The three major global developmental changes i.e. agrarian, industrial and information and their social, economic, political, technological, and cultural effects are being experienced simultaneously by Papua New Guinea today.

Attempts have been made in the past to harness the rising volume of information, i.e managing and controlling information as a resource for national development .

In 1977, a Communication Policy for Papua New Guinea was drafted by the Government Liaison Division of the now defunct Office of Information to "provide a basis for discussion in the form of definition of terms, areas for communication policy decisions, outline of the present situation in P.N.G. in relation to communication needs, and strategy in developing the policy".(8).

The following year, Sommerlad, the UNESCO Regional Communication Adviser for Asia, prepared a paper for a Communication Policy Seminar held in October in PNG on "Why a Communication Policy and Plan?".

Both papers saw the wider implications of information as part of the communication process, but no such policy was implemented at the national level.

In the preparation of this paper, a number of people expressed the view that information is an important resource and source of revenue, with its own policy and as such a necessary component under the wide umbrella of a Communications Policy.

In June 1990, when the National Librarian submitted his proposal for a National Information Policy, the Manager of the Programme Management Unit in the Prime Minister's Department felt that it was "unproductive at this stage to comment specifically on the content ..... as there are two national programmes which have now been developed under the RMS (Resource Management System) in which the contents of the proposed National Information Policy are being addressed" (9), i.e. the Literacy and Awareness programme and the Integral Community Development Programme.

Current Policy and Programme Developments

The Resource Management System is the PNG Government's attempt to come to terms with information issues and concerns that are faced by the people. This is the basis for determining Government's national objectives to be carried out by its lead and support departments, right down to the monitoring and evaluation of the impact of these policies on the people (10).

A number of policies and programmes have been developed since RMS which are within the objectives and directive principles of the National Government. One current policy is the Computer Policy which is an attempt to control the types of hardware and software being used by Government agencies. It is a difficult task especially with different specialities and the everchanging nature of the computer age.

National Objectives and Mission Statement Documents

There are 42 National Objectives among 23 National Departments. The National Objectives were developed as an integral part of the Resource Management System, a planning and public administration process which focuses all government activities on "issues and concerns related to people".

The Mission Statement Documents are instructions from the political level to the public service, and constitute the basis of departmental accountability. Each objective has a lead agency which convenes other national and provincial department who may be responsible for it. For example Objective 40 is "To ensure the effective development and implementation of government policy responding to the issues and concerns affecting people".

The lead agency is the Prime Minister's Department and the major contributing or supporting agencies are the Department of Finance and Planning and the Department of Personnel Management.

Literacy and Awareness Programme

The goal of this Programme is - "to help people understand the changes that are occurring in contemporary society" (National Objective 13).

Its aims are:

1. To increase literacy in Papua new Guinea.
2. To develop a management structure, patterns of operation and materials which provide the basis for the continuing development and provision of a national Literacy and Awareness programme.
3. To integrate local knowledge and awareness of information to increase interest in and understanding of changes.
4. To promote community participation in development and government.
5. To document all existing and proposed literacy and awareness activities at both the government and NGO level.
6. Rationalize all existing and proposed literacy and awareness activities at both the government and NGO level for maximum efficiency.

The above programme resulted from a concern to assist people to make sense of their lives, to maintain family, community and national solidarity, to improve peoples' ability to participate in governance and to feel part of the development effort.

Integral Community Development Programme

This programme specifically addresses National Objective No. 12.: "To encourage and support local efforts to meet Basic Minimum Needs and improve the quality of life". It is hoped that the Programme will promote the opportunity for people to participate in the decision making process both at the community level and through their provincial and national representatives. This has been signed by the Prime Minister to go before Cabinet.

National Training Policy

The National Training Policy White Paper of January 1990 presents forty-seven strategies with the aim of using training to raise workers' motivation, performance and productivity for their Departments or companies and in the service of Papua New Guinea and its people. The Policy provides clear guidelines for planning, conducting, facilitating and evaluating training, both within Papua New Guinea and for Papua New Guineans overseas. This policy is interlinked with other Government initiatives on manpower planning.

National Science and Technology Policy

The draft policy of 24th September 1990 in its preamble states that: "This Policy asserts the right of Papua New Guineans to determine the ends to which science should be directed. It affirms that scientific pursuits are a fundamental intellectual activity of all of our people. It puts forward mechanisms through which we may select the appropriate types of technology and express our preferences for those which extend human capacity, dignity, diversity and understanding, and which accord with the kind of society that we intend to achieve."

Legal Constraints

There is no copyright law in the country. The recent WIPO South Pacific Copyright Workshop held on October 22-23rd 1990 will hopefully remedy this situation to avoid plagiarism and piracy.

The Classification of Publication (Censorship) Act 1989 was certified on December 4. The Censorship Board formed under this Act has the function to formulate policies on censorship. It covers both literature and film.

Conclusion

The multiplicity of languages, the difficult physical geography and the fact that much of the communication is one way does not make the information flow from the national level to the grassroots level and back a success.

Papua New Guinea does not have a national information policy. There needs to be a policy endorsed at the national level to coordinate all sectorial policies to avoid duplication of activities, and make better usage of limited manpower resources, and for better control to enable monitoring and evaluation of objectives of individual policies within its umbrella.

A national communication policy would be the most viable way in which a national information policy could operate, as communication is a two way process and a government needs to have feed back on its policies, programmes, and decisions to be effective.

Whichever type of policy is chosen, it would have to be within the philosophy of the nation's Constitution, its national objectives and directive principles based on:

- Equality and Participation
- National Sovereignty and Self-Reliance
- Our Resources and Environment
- Papua New Guinean Ways.

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A Brief Introduction to National Scientific and Technical Information Policy In China

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Preface

Information is a national strategic resource, and the foundation of social, economic, scientific and technical development. As an important part of national information policy, the scientific and technical information policy has been playing a significant role in developing and utilizing of information resources in China.

Established over 30 years ago, the scientific and technical information industry in China has now grown into a nationwide scientific and technical information system of moderate scale. Scientific and technical information efforts have achieved notable economic and social results by providing large quantities of valuable information and documents for decision-making at all levels and for scientific research and production activities.

In 1985, under the guidance of the reform and opening policy, the ideas of strengthening management awareness and user service were first advanced. The concept of fee-for-service broke down the traditional pattern of thinking about information work and promoted a new attitude.

However, quite a few problems still exist in the development of scientific and technical information transfer, which hinders it catering for the fast changing situation in China. In order to meet the ever-growing information needs in society, scientific and technical information work must develop further. Today, the scientific and technical information undertakings in China are developing in the direction of socialization, industrialization and specialization. China should build up a scientific and technical information policy with its own characteristics by following the development direction of socialization and industrialization, according to China's needs and national resources.

"To tap information resources and serve four modernizations" is the basic guiding principle for scientific and technical information work in China. The scientific and technical information undertaking is a key link in the construction of four modernizations and ought to adapt itself to the general strategy of national economic development. Thus, the developmental goal of the scientific and technical information undertaking in China by the year 2000 is to deepen reform of the national scientific and technical information system, adjust information product structure, strengthen the fundamental structure and functions of information systems at all levels, improve technical means, develop multi-functional databases and on-line retrieval networks, continue enhancing the width and depth of information processing, research, reporting and dissemination, and to raise service abilities and standards so that a scientific and technical information system with a greater efficiency, along with the development of science and technology, economy and society, may be formed nationwide.

The realization of this strategic goal requires great efforts from all concerned. The most important matter is to develop a systematic and comprehensive scientific and technical information policy with the aim of guiding the development and operation of the scientific and technical information and coordinating information activities in this country, and lay a foundation for formulating a developmental programme and plan of China's scientific and technical information, as well as framing information laws and regulations.

The formulation of the national scientific and technical information policy must proceed from China's actual conditions, taking China's information resources and financial ability into account. The developmental strategy for the scientific and technical information undertaking should be determined in accordance with special characteristics of China's scientific and technical work so as to ensure the continuity, systematization and integrity of the scientific and technical information policy. Under this guiding principle and following UNESCO's Guidelines for the Formulation of National Scientific and Technical Information Policy, China's scientific and technical information policy should embrace twelve parts and be designed on the base of the accumulation, summary and distillation of experience in Chinese scientific and technical information work over several decades.

China began developing its scientific and technical information policy in 1985. Development lasted 5 years, and now is basically completed, after revising and supplementing the policy several times. The design of a scientific and technical information policy in China has received support from UNESCO PGI. In 1986, a Meeting of Experts on Scientific and Technical Information Policy in China was held in Beijing, in which foreign and Chinese information experts participated, and put forward suggestions and comments to the Chinese government on the design of national scientific and technical information policy. In the same year, the Scientific and Technical Information Departments under the State Science and Technology Commission (SSTC) gathered together directors of several information institutes and some information specialists to discuss and draw up a draft of "An Outline of National Scientific and Technical Information Policy in China". This draft was then submitted to the 7th Working Meeting of National Scientific and Technical Information for approval. SSTC authorized its trial operation. In recent years, some information specialists have been working hard on revision and interpretation of the "Outline".

Improving and Developing the National Scientific and Technical Information System.

In view of the Chinese historical traditions and social environment, the main effort should be focused on developing scientific and technical information operating system in China and strengthening major social functions of China's scientific and technical information.

Working objectives of the whole system should focus on scientific and technical information (including scientific information, technology information and technical economy information). However, various information institutions at all levels should make efforts to diffuse information on economy, market management, etc., in accordance with the demands of users and capabilities of their neighbouring information organizations.

The types of information to be processed by the system should include document and non-document information.

Consolidating and strengthening functions of the whole system in information order-retrieval capacity and information research-consulting capacity.

Improving the Scientific and Technical Information Organizational System

The organizational structure of the national scientific and technical information system should be composed of organs and functions as follows:

- Scientific and technical information administrations at all levels.
- Comprehensive and specialized information institutions at all levels.
- Specialized information networks stations of all descriptions.

Social entities engaged in some major scientific and technical information activities, such as document centres, scientific and technical libraries, academic institutes and training centres for professional information education and user training, and other state-owned, collective-owned and privately-owned information units.

- Part-time information personnel, such as part-time information researchers, translators and documentalists.
- Social forces convened by information organizations for taking part in information activities, such as retirees, scientists and technicians, translators, private information collectors.
- Information users.

Strengthening the Construction of Documents Supporting the System.

Documents are important information resources. The national scientific and technical information system in China aims at developing and utilizing information and materials collected.

Acquisition work of documents and information should comply with the principles as follows:

- Meeting the main demands of national economic construction and scientific and technical development.
- Increasing varieties of information production, reducing duplicated copies and avoiding irrational overlaps.
- Giving priority to practical demands, and paying attention to the integration of short and long-term requirements.
- Guaranteeing a complete collection of valuable materials with a high rate of utilization.
- Practising economic accounting in order to make storage forms diversified and practical.

On the principle of unified planning, rational arrangement, different stresses and resources sharing, the rationalization of document distribution should be vigorously promoted within the information system. The national scientific and technical information system has a structure of three levels of document distribution. These are separately formed at the levels of the state, specialized ministries and local regions.

The information and document institutions at a national level include the Institute of Scientific and Technical Information of China, the Information and Documents Centre of the Chinese Academy of Sciences, Beijing Documents Service, the Patent Literature Library of the State Patent Bureau and the Centre of Standard Literature of China. These organizations should decide the division of their work in collecting documents. The provision of imported tapes should basically match with their primary materials.

Scientific and technical information centres under the specialized ministries aim at collecting information and materials which are closely related to their specific line of work. They are responsible for organizing and co-ordinating the collection, processing, distribution and dissemination of documents and provide services within their systems and to the whole country as well.

Regional scientific and technical information centres, consisting of institutes of scientific and technical information in provinces, autonomous regions and municipalities. They should decide the directions of document collection and information service, as well as establish information sharing systems according to the programme and stress of economic, scientific and technical and social development in their own regions. Scientific and technical information institutes in administrative regions and counties are responsible for collecting and providing practical technology information to meet urgent needs of local industrial and agricultural production.

Strengthening the Compilation of Information Retrieval Tools.

Information organizations and units should compile reference publications and establish tools for the scope of their collection so as to provide users with perfect retrieval means and facilitate information utilization.

In perfecting and developing documentary search tools and designing factual and numerical retrieval references, great efforts should be taken to strengthen planning, coordination and exchange in order to avoid the duplication of work.

It is necessary to further develop retrieval tools in book and card forms and accelerate the development of retrieval means by tape, floppy disc, microfilm and CD-ROM.

Enhancement of Information Research and Study.

Information research institutes at all levels should increase the proportion of information service for production technology while continuing to provide information service for decision-making, scientific research and production. They should provide information service for companies and enterprises according to the need of their development.

Information research institutes at all levels should actively apply to planning, economics, and science and technology administrations for decision-making topics according to the need for administration, scientific research, production, management, education etc. Through in-depth investigations and studies on both domestic and foreign information resources by modern technical means and methods, they should write research reports with comparative analysis, judgement and proposals.

Adoption of Modern Information Technology and Gradual Realization of Modernization of Information Facilities.

The basic development direction of scientific and technical information in China is to gradually realize the automation of the scientific and technical information retrieval network based on computers and new information technology.

Competent information organizations should, according to their conditions, be equipped with mini- and micro- computers, and promote the application of microcomputers. The computer models should be selected according to the national standard set by the state as much as possible. They should pay attention to the integration of microcomputers, microform technology and optical disk storage technology in order to set up Chinese character data bases with Chinese characteristics.

Cooperation and coordination should be made with the post and telecommunications departments in establishing on-line information retrieval networks in order to accelerate the development of a public data telecommunication network. All units in a region covered by public data network should make the widest possible use of the network.

Different ways of communication may be used by units in other regions to link with each other for on-line retrieval.

Promotion of Information Dissemination and Circulation and an Information Consulting Service.

Information dissemination and flow is a connecting link between information production and information consumption and a powerful means for promoting the close integration of science, technology, and the economy. The value of information lies in its usage. The actual results of data can only be achieved when information, through the procedures of acquisition, procession, handling, management and coordination has been put to use. Therefore, information dissemination and flow must be accelerated.

The principle of "initiative, multi-direction, quickness, and accuracy" must be followed in the promotion of information dissemination and circulation.

Heightening Management Awareness and Deepening Information Service.

Scientific and technical information institutions are non-profit organizations. The price of information products has long been lower than information value. Accordingly, scientific and technical information institutions should attempt to promote paid information services for the purpose of improving their self-developing abilities. The state government should protect and support activities of paid information service, and a necessary preferential policy should be formulated.

The relationship between social service for the public good, and paid service should be correctly handled so that various information activities can be smoothly carried out.

Information institutions at all levels should, according to the different needs of users, provide information products which have been processed and reprocessed by information workers, improve service attitude and raise service quality.

Information institutions must heighten the awareness of information production as commodities, and deepen information service. They should on one hand continue basic information work and providing a public service, and on the other hand, strengthen information management, enhance the awareness of the information commodity market and information value and introduce competition into information service.

Strengthening Information Users' Study and Training.

The starting point and destination of scientific and technical information work is to satisfy the information needs of Chinese users. Multi-aspect and multi-level user surveys should be carried out to thoroughly understand the characteristics and the changing trends of various user needs, to grasp the regular pattern of information needs and to organize the information acquisition, processing, and dissemination according to need.

Scientific and technical information institutions at all levels should put stress on the user's investigations, call on decision-makers, scientific and technical researchers and enterprises regularly and make survey and analysis on their needs by ways of questionnaire and statistics.

Information utilization largely depends on the user's information consciousness. Therefore, the training of information users is very important. Information organizations at all levels as well as higher learning institutions have the responsibility to train users in information knowledge and information technology in various ways and by various means.

Expansion of International Information Exchange and Cooperation.

Scientific and technical information work in China must follow the policy of "opening to the outside world", and actively expand international exchange and cooperation in the scientific and technical information field. This includes international interchange of books and periodicals, international inter-library loans, participation of academic activities, personnel interflow, cooperation in business and development of the international information market.

Scientific and technical information institutions at all levels should, according to their own needs and strength, selectively carry out bilateral or multilateral exchange and cooperation with other countries and international organizations on the basis of equality and mutual benefit, and take in "nutrition from the outside to develop our information undertaking". In order to maintain the stability and continuity of external exchange and cooperation and gradually enhance the capability of external exchange, it is necessary for Chinese scientific and technical information institutions to create conditions for offering international society more information products.

Promotion of Study in Information Science.

Informatics is the science of studying the pattern of information activities and the theoretical basis of information development. National scientific and technical information systems in China should fully absorb the research outputs of foreign informatics, while actively carrying out our own information research to develop and perfect the informatics theory system.

Informatics research should take the conditions in China as a starting point, emphasizing applied informatics research to solve problems of theory, policy, technology and methods in developing national scientific and technical information undertaking and instructing the scientific and technical information activities.

Promotion of Manpower Development.

Great effort should be made to develop information education and to train postgraduates with double degrees and undergraduates in information science and secondary special (or vocational) school students needed by the information undertaking. Particular attention should be paid to train postgraduates and secondary specialized (or vocational) school students in order to change the present irrational structure of personnel and to recruit scientific and technical personnel suitable for doing information work.

On-the-job training should actively be carried out, and rotational training should be brought into action step by step for all information administrative staff and scientific and technical information personnel. Effort should be made to create an environment suitable for talented persons to present themselves and develop a large number of information specialists who are internationally known, and proficient in professional work and foreign languages as well.

Strengthening Scientific and Technical Information Management.

Scientific and technical information management should be strengthened in a planned way.

Scientific and technical information administrations at national, regional and departmental levels should draw up scientific and technical information directives and guiding programmes for basic, annual and significant projects in science and technology. Scientific and technical information organizations are allowed to have some leeway. Scientific and technical information organizations at all levels may, under the presupposition of accomplishing their assigned tasks first, produce marketable information products and provide commercialized services to meet users' needs.

The management of scientific and technical information targets should be strengthened. Scientific and technical information organizations at all levels should, according to the principle of target management, set up a target management system and conduct scientific analysis on targets at every level. This should be put into practice step by step to guarantee that the general goal of scientific and technical information services development be realized on schedule.

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National Information Policy and the Progress of a National Information System in Thailand

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Background

The Thailand UNISIST Committee has been developing and implementing a National Information System since 1981, with an aim of co-ordinating all existing information resources and to satisfy the information requirements of the Thai society. In 1986, a National Information Policy was adopted to support its establishment. This was approved by the government in late 1986. The movement towards the establishment of such a system was influenced by the increasing concern of the government about the social and economic development of the country. The first Five-year Plan, which provided guidelines and methodologies for development, appeared in 1961. Thailand is now moving now to the seventh Five-year Plan (1992 - 1996). During this time, Thailand may join the other industrialized nations as a Newly Industrialized Country in which the effective use of information will be one of its most significant features.

National Information System

The National Information System project was first drafted by the Thailand UNISIST Committee in 1981. After long discussions and careful consideration, the project was revised and submitted to the Cabinet in 1985. Its concepts and contents were scrutinized by the National Security Council before the approval and promulgation were made by the government in December 1986.

Objectives

The objectives of National Information System are:

1. To adequately satisfy the information needs of all users from the government and the private sectors.
2. To ensure that different information systems in existence are mutually compatible, both nationally and internationally.
3. To eliminate duplication of effort in providing information services.
4. To provide means for cooperation, co-ordination and exchange of information at national, regional and international levels with careful consideration of national benefits and protective security.

Components and Structure

The National Information System comprises :

1. Different groups of information producers including individuals, government agencies, state enterprises, professional societies and publishers.
2. Information service units which cover libraries, documentation centres, information centres, archives, etc. whether independent or members of government agencies or private enterprises.
3. Education programmes for trained personnel in the design and operation of information systems and services offered by universities and colleges as well as professional societies.
4. Users who are both clients of information services and producers of information.
5. The governing bodies who formulate policies and programmes and the coordinating bodies who supervise implementation plans.

National Information Policy

The need for a concrete National Information Policy with a mechanism to implement it developed along with the formulation of the National Information System. However, it was not until 1986 that a National Seminar on National Information Policy was organized by the National Research Council of Thailand in the capacity of the ASTINFO Co-ordinating Unit (ACU), with the assistance of UNESCO . The objective of the Seminar was to sensitize national authorities on the essential elements and relevant issues on National Information Policy with particular reference to the social, economic, cultural and political contexts of Thailand.

The participants of the seminar included decision makers from national authorities , information specialists from information institutions, and end users from the private sector.

A working paper on National Information Policy was prepared by an ad-hoc Task Force, taking into account the "UNESCO Guidelines on National Information Policy". Modification was made during group discussions and it was suggested that the government of Thailand should adopt the following National Information Policy:

1. The government will certify that information is an integral part for national development and that high priority should be given to government information sources.
2. The government will give attention and allocate appropriate resources for the formation and improvement of information systems and services in accordance with the objectives of the National Economic and Social Development Plan.
3. The government will promote the awareness of and access to information to all users and grant the right of access to information to all the Thai people.
4. The government will promote, arrange and operate user education and training at different levels in order to maximize the effective use of information for both self and country development.

5. The government will promote and arrange appropriate professional education and training for different levels of personnel engaged in information activities.
6. The government will promote and support information personnel in area of professional security and achievement.
7. The government will promote and accept a special responsibility for fostering research in the development of information systems and services.
8. The government will promote and facilitate co-operation and co-ordination of information activities at a national, regional and international level with special consideration for national benefit and protective security.

Recommendations made for the further implementation by the government in line with the adopted National Information Policy include:

1. The formation of linkage and co-ordination mechanisms for information activities at a national level.
2. The improvement of regulations, rules and laws to support information systems and related activities.
3. A survey of users' needs for information.
4. A survey of information sources and existing manpower.
5. The preparation of work plans in line with the adopted Policy.

Implementation Activities

The adoption of a National Information Policy and the establishment of a National Information System, known in short as THAINATIS, in 1986 has led to activities which include:

1. The appointment of a National Committee for Direction and Co-ordination of THAINATIS in April 1987 with the Deputy Prime Minister as Chairman and the National Library of Thailand as Secretariat. This governing body will formulate policies and make decisions on the measures that will enable THAINATIS to perform its role.
2. An appointment of six Co-ordinating Centres in January 1988 to supervise the planning, development and implementation of THAINATIS in subject fields which include:

Agricultural Science	Kasetsart University Library
Economics	Bank of Thailand Library and Information Centre
Humanities	National Library of Thailand
Medical Science	Mahidol University Library
Science and Technology	Scientific and Technological Information Division, Department of Science Service
Social Sciences	Development Document Centre, National Institute of Development Administration.

A sub-committee has been set up under each Co-ordinating Centre consisting of 18 to 25 members which are expert, representatives from the Thailand UNISIST Committee, government agencies, university libraries, professional societies and private enterprises.

3. The organization of meetings of various sub-committees and the working groups appointed thereunder.
4. The arrangement of programmes for personnel development which include training and seminar attendance both in Thailand and abroad.
5. The organization of national and international seminars.
6. The provision of service for on-line and off-line searching of foreign databases and the creation of national databases on different subject fields.
7. A survey on Information Resources in Thailand.
8. The publicity of THAINATIS in the form of lectures and announcements through various media, exhibitions, and document distribution.

The most important effort to stimulate the general awareness of top administrators in Thailand was the organization of "National Seminar on Administrators and the Development of Information System" held at Government House in August 1990. The Seminar was presided over by the Prime Minister and the number of participants totalled 278, including the governors from all Provinces in Thailand, the Governors of State Enterprises, the Director-General of various government agencies, the directors of different Divisions and Executive members of some private firms who have the important roles ôf promotion, support, and co-ordination of existing information services.

Other activities being planned include:

1. The drafting of a plan for future implementation of THAINATIS to be included in the forthcoming Seventh National Economic and Social Development Plan (1992-1996).
2. The setting up of a Standard Committee to draft and consider standard bibliographical description. Major technical constraints are now being caused by the lack of compatibility.
3. An updated survey on information resources in Thailand and the appointment of another Co-ordinating Centre on geographical information.

Conclusion

The content of National Information Policy and the structure of the National Information System, as well as the mechanism to implement it, may vary from country to country but the main objectives will be similar to every nation. Policy issues may be modified or updated in the light of new requirements and the advancement of information technology seems to be the driver of such modification and the cause of significant changes in education, continuing education and training programmes for information personnel.

The recommendation should be made, therefore, that the attention of the government should be directed to the impact of changing information technology and the changing patterns of information dissemination. The responsibility for the development of manpower and appropriate education and training programmes should also lie with government.

It is envisaged that the National Information System, with the application of modern and sophisticated information technology and telecommunication facilities, will involve heavy expense which can be expected to cause a delay in implementation by most developing countries.

A recommendation should also be made that telecommunication services should be subsidized and imported equipment for the operation of the National Information System should be tax exempt.

Changes to Information Demands and Activity in Scientific and Technical Information in USSR's New Economic Situation

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Some parts of the USSR have rapidly gone over to the market economy, and very often when this happens the desires of the masses overtake the state legislation mechanism. Some of the Republics have expressed their desire to secede from the Soviet Union. When the centralized command and bureaucratic system is restructuring, sometimes the new alternative administrative bodies can't be easily and quickly established. The rights and obligations of central and republican administrations significantly change. These facts have an effect on each information body and on the State Scientific and Technical Information System as well. The situation is always changing. Nevertheless, some trends can be seen that are now taking place in the field of Scientific and Technical Information (STI).

1. Centralized financing from the Union Government in the sphere of STI has significantly decreased. However, the republican administrative bodies are considering the importance of the information institutes and centres are, at the moment, trying to keep the funds at the same level using republican budgets.

2. The STI bodies are now given more freedom to decide on the types of activities and determine prices for services. A more progressive mechanism of incentives for information workers is being developed. Almost all STI bodies have become self-financing, i.e. profit oriented organizations.

3. Formerly, republican and regional STI bodies carried out their activities within their own territories and corresponding interdisciplinary bodies only served their own Ministries. Nowadays these organizations go out of their regions and search for consumers regardless their location and departmental subordination, thus competing with each other.

4. A great number of small commercial information cooperatives are being established which actively compete with state information bodies in specific spheres.

5. These new market relationships require more attention to advertising and information services distribution. Formerly, the importance of this issue was neglected. For example, the administration of GruzNIINTI (Georgian Research Institute for Scientific and Technical Information) has come to the conclusion that it is necessary to advertise regularly and on a professional level. Consequently the Department of Marketing of Information Products and Services has been developed. In November 1990 the Workshop on Marketing of Information Products and Services will be held in GruzNIINTI. Other information bodies also act as commercial information brokers.

6. Small enterprises have become active users of information products and services and their number increases constantly. In the USSR in 1985, there were eight hundred thousand (800 000) enterprises and organizations, but since then about two hundred thousand (200 000) cooperatives and tens of thousands of small enterprises have appeared. In Georgia alone over the last four years, the number of enterprises and organizations has increased from 10000 to 17000 due to the appearance of cooperatives and other small enterprises.

7. New enterprises have changed the requirements for the form and content of information. There is an observed reduction in demand for documentation and scientific information (it is hoped that this will not last for a long time). For instance, in GruzNIINTI the number of the user-organizations, consuming traditional STI regularly, was 306 in 1988. In 1989 their number became 411 and in 1990 it fell to 338. This is also reflected in the income gained from these activities: 172000 roubles in 1988, 289000 in 1989 and 202000 in the current year. However, the volume of demand for factographic information (especially prices on products and raw materials, and reference information such as addresses of foreign and domestic enterprises and the products manufactured by them) is increasing. In this regard, at the Institutes of Information of Lithuania, Estonia, Georgia etc. the activity of creating "Republican Enterprises" Databases in Russian, English and the national language is progressing successfully. This information is planned to be distributed to the republics, USSR, and abroad.

8. In spite of centrifugal political movements, the information bodies within the State System of Scientific and Technical Information, are trying to maintain their old business contacts and partnerships. This helps them to search out manufacturers, suppliers of raw materials, and products for Soviet and foreign user organizations. Under abrupt changes in the economic system and the disintegration of the administrative distribution system, only information bodies can solve the resulting problems. New forms of amalgamation of STI bodies are being established in the form of economic associations.

9. The total demand on information services has reduced although in some specific spheres the demand has increased. The income that Scientific and Technical Institutes acquire from the arrangement of advertising, workshops and business meetings with representatives of foreign companies is increasing. For instance, the department that deals with this kind of activity in GruzNIINTI increased the revenue from 60000 roubles in 1989 to 62000 roubles in the first half of the 1990. The revenue from brokerage activities by STI bodies is rapidly increasing. The Armenian Institute for Scientific and Technical Information was an initiator of this kind of activity and nowadays almost all the institutes and centres are dealing with this. Thus, the main process taking place in the sphere of information in USSR is the adaptation to new economic conditions and conversion of activities so that it can take a worthy place in the new economic and social structures.

Information for Industry

The Computer Versus the Human Brain

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Almost every area of human endeavour is today managed efficiently and "cleverly" by computers. Due to their fast development and high performance capabilities they pose poignant questions concerning their comparison to the human brain.

Microcomputers, equipped with multiprocessors, can today perform hundreds of thousands of operations per second. Local workstations can outperform today the generation of mainframes of five years ago. We utilize very sophisticated applications in a relatively simple and easy manner and with ever diminishing costs. Do we face an era of "intelligent systems"?

Before we try to solve this question, let us look for a moment at a bee; the one which is called the "wolf bee". This bee, which belongs to the family of the hunter bees, has its permanent dwelling in a cave which it digs for itself at the sea shore. Hundreds and even thousands of bees can dig for themselves such caves in a relatively confined space. Still our bee will identify its personal cave without fail every time it returns to it.

This phenomenon was investigated by a biologist. He simply closed the cave entrance and covered it with sand and awaited the return of the bee from its hunt. The bee, without fail, returned to the exact place where the cave entrance had been and started to dig in order to reopen the entrance. In addition, it became evident that upon leaving the cave, the bee first flew a couple of circles of different heights around the cave entrance before it left the area for its hunt. It seemed that in this fashion the bee memorized a number of outstanding landmarks which characterized the cave entrance. In order to prove this assumption, the investigator changed a number of these landmarks while the bee was "at home". After the bee had left its cave, had flown its circles in order to memorize the area and left the vicinity, the investigator transferred these conspicuous landmarks a couple of meters away from the cave entrance. The returning bee started, indeed, to look for its cave entrance which it could not find. However, unlike the behaviour of human beings, it did not - after its unsuccessful search - look for its lawyer or psychiatrist! It simply realized that something had changed and it ascended to a higher altitude in order to recognize further additional landmarks for its cave entrance. These, indeed, provided the bee with the correct orientation for the cave entrance.

The nearest computerized analogy to this "biological" recognition capability exists in the military sphere in the form of the self-navigation system of the cruise missile. This is based on a computerized system called TERCOM (Terrain Contour Matching). In the navigation computer of the missile there is stored a series of computerized maps. On these maps there are marked significant landmarks of the path which the missile is programmed to pursue to its target. At these landmarks the program compares the radar signal which bounces from them with the data of these landmarks on the computerized map. If the program discovers

discrepancies between these data, it seeks additional landmark data which could tally with those stored on the map. As soon as it has found these, it corrects the flight path accordingly. Thus, if we want to deflect the missile from its path, all we have to do is to move the target from its location and substitute a dummy target. And since the missile and all that is in it is destroyed on impact, together with the dummy target, the computer will never be able to realize that it erred.

The navigation computer in a modern cruise missile weighs "only" 50 kg but contains millions of transistors and represents the latest in computerized navigation technology and as such is valued at the greater part of a million dollars.

The brain of the bee is no bigger than the point of a needle, but it has to solve much more difficult problems than directing the correct return flight of its owner. It must recognize the prey, monitor its flight, compare it with the flight of the bee so that the prey can be captured. It must direct and lead the bee in all its activities, digging, walking, seeking a mate and all the other thousands of essential activities of life. The navigation computer, when compared to the tiny brain of the bee, looks pretty dumb. Nevertheless, a lot of ignorant people consider the computer to be higher up in the intelligence scale than the human being.

Even the most retarded human being activates greater and more complex thinking mechanisms than the biggest and fastest computer. Or, to put it differently; what size of computer would we need, with how many thousands of programmes, in order to activate a robot to perform some simple activities: to get up from a chair, to put on a coat, to leave the building and take a stroll around the block and to recognize the correct entrance door on his return? All this is done easily by the human brain. And in addition, it operates a monitoring system for blood flow, blood pressure and other chemical body processes, a sensor system for air, wind, humidity, light and sound and a host of other sensations! Let us look specifically at the information capabilities of the human brain. What enormous amount of information is it capable of storing as memories and as learned material! How very complicated is the correlation process between learning, memory and creation of new information! As far as information processing is concerned we have to admit that the computer is only a machine, albeit a sophisticated one. And even when next year a new computer model with better performance capabilities will replace this years' computer, the new one is still only a machine. And so with the model for the second year, none of them come yet near the performance capabilities of the brain of the hunter bee; not to speak of the capabilities of the human brain.

Information for Industry in Thailand

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The industrial structure of Thailand consists mainly of small and medium scale industries, and the growth of rural industries has been evident during the past three decades. Manufactured products, which accounted for 12% of export earning in 1983, increased to 65% in 1988. At the present time, about 25 industries are in existence, for example: agricultural machinery, air conditioning and refrigeration, aluminium, automotive assembly, auto parts, cement, ceramics, chemical, electrical and electronics, food processing, furniture, gas, glass, iron and steel, leather based, pharmaceuticals, plastic, pulp and paper, rubber based, packaging, plywood and wood based, textile, printing, garment and shoes.

To cope with the rapid changes in the world economy, these existing industries need a wide range of information which are related to the execution and development of business investment, process and productivity improvement, waste treatment, marketing prospects, energy factors in production, packaging for maximum shelf life, as well as laws and regulations. Large industries in Thailand (in joint venture with companies or manufacturers from various other industrialized countries) can use their own efforts to obtain information through direct contact or business association. Small and medium industries usually seek help from information sources of government agencies and the private sector.

Information available from government sources is numerous and mostly in an undigested form, which can only be used as a starting point for what entrepreneurs want to know. Further R & D or extension and consultancy services on new technology relating to processing and productivity improvement, cost saving and training in advanced management systems and marketing techniques seem to be the most useful means that serve the information needs of various industries in Thailand.

As for the private sector, The Federation of Thai Industries and the Thai Chamber of Commerce have very important roles to play in the development of Thai Industry. Members of the manufacturing sector can provide useful information and help to sort out and identify the problems for industry, as well as represent industry in discussions with the government. Cooperation between R & D institutes and industry in joint projects leading to commercialization are being stimulated by many authorities. Participation in TIPS, an international network for the exchange of technology and trade information among developing countries has been considered but cannot be implemented due to the cost implications.

Information for Industry: The Australian Scene in 1990

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Summary

Australian industry has access to a vast supply of information to support their activities, however there is a reluctance to use this information resource effectively. This lack of demand can be attributed to cultural problems, a lack of understanding of the importance of information in providing a competitive advantage, and the "old boy network" which provides a substitute for formal information services.

Background

Australia is a diverse and sophisticated society, with a large range of businesses in most industrial sectors. Businesses in Australia range from multinational companies with interests around the world to "one man bands". However, most businesses in manufacturing industry are small operations, usually employing less than 10 people. Agricultural businesses are usually large companies operating on a geographically diverse basis. For example, one agricultural company owns 10% of the land area of Australia.

In this situation, it is difficult to provide details of the information requirements of industry. However, there are some significant differences in the way in which industries have approached the need for information.

Agricultural Industries

One of the largest industry groups in Australia, particularly in terms of export earnings, are the farming and agricultural sectors. Wheat, wool and sheep are prime agricultural products. The information needs of these groups have been well served by the State Government Departments of Agriculture. Since the inception of these departments, extension and advisory services have been offered. The major information source has been research carried out by various organizations such as universities, government departments and some independent government funded bodies. Although overseas research is of importance, the unique nature of the Australian climate and particularly soil structures has meant that Australian research has underpinned most agricultural developments.

Thus Australian agricultural industries have been dependent on Australian research and have had a very extensive information transfer system which has worked well for many years. Pressures on government funding are now increasing and farmers have been asked to pay for some information services. This has caused some resentment within the agricultural communities and is being resisted.

However, the general cultural attitudes of farmers allows the combining of resources to support research and then the general dissemination of the results of that research. These are some of the factors which have lead to Australian agriculture being amongst the most efficient in the world.

Manufacturing Industries

Manufacturing industry in Australia is undergoing a restructuring and is being forced by government policies to become more export oriented. This has caused a great deal of difficulty for many manufacturers, as under previous governments they were subject to relatively high levels of protection. These levels of protection provided few incentives to keep up with world trends or to invest in product development.

Most manufacturing industries in Australia are small businesses with few resources to spend on research or development. The large multinational companies have all the resources they need to invest in research, product developments and in information activities. However in many cases the multinational companies spend their research money in the country of the Head Office and not in Australia. This has lead to a very poor investment in private research and development in Australia. The consequence of this trend is that most Australian companies are dependent on overseas developments to improve their products. This exacerbates a trade imbalance and ensures that information transfer activities for the development of manufacturing industries is not as well developed as in the agricultural industries.

The culture of manufacturing is more competitive and more interested in short term gains than agriculture. Because the companies are small, the owners depend on colleagues to learn about new ideas and developments. This culture has not been conducive to the development of satisfactory information transfer systems.

Those information systems which do exist are run by a range of organizations. For example, each State government operates a body such as the Small Business Development Corporation whose task is to encourage small businesses and in particular to ensure that people setting up new businesses have the skills necessary so that the business has some hope of succeeding. Most new businesses in Australia fail within one year of starting. Technical information for product development is not easily available. Some organizations such as CSIRO, provide consulting services which seek to introduce product ideas which have developed out of research projects into businesses, or to undertake research which will solve particular technical problems. Most Universities also have companies which aim to introduce the results of research into the business community. Government incentives encourage the development of businesses and increased research activities, but most of these programmes are of limited value because the culture of the business community does not yet accept the need for information to develop their businesses.

Cultural Change

The outlook for change in attitudes to the need for information to support industry in Australia is bleak. Although there is a considerable amount of rhetoric about the fact that a competitive advantage can be gained from information, there is little understanding of the way in which information can assist and how to access the information. Current courses in business at various colleges and universities do not include a significant component of information sources to assist business, and the library schools are still mainly providing librarians and information professionals for government funded libraries, such as public, school or universities. Governments have found providing technical information too difficult.

It will be some years yet before a significant change occurs to ensure that all industrial bodies in Australia who need information have the understanding of the problem to assess the correct source of information and to obtain the information they require quickly and easily. On the other hand, it will also be some time before the most appropriate sources of information are available and easily accessible.

Information for Industry: Definitions, Clarifications and Needs

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Information for Industry is essentially an all-embracing, multifacetted subject. As the name implies it includes every kind of information that is needed for industry.

In the following paper, an attempt will be made to define and to describe more precisely these very needs. Basically they can be classified into two categories:

1. Technical Information
2. Economic-Financial Information

Both types come from different sources. Some information is accumulated and organized in-house (in-house information) and some information is obtained and retrieved purposely and directly from outside sources according to needs.

Technical Information

Technical information relates to the goods or services which industry produces or provides, as well as to the production and operation processes which create these goods and render these services.

All technical information concerning products, their properties and characteristics should be well known and documented. So should their applications and uses. All this information should be surveyed periodically in order to contemplate changes and developments of the products for new applications and uses.

It should be pointed out that nowadays, services represent an industry in their own right and are treated exactly like products. Their properties and characteristics too should be well understood in order to put them to the best possible use, and in order to develop them for further extended applications.

Production and operation processes exist for products as well as services. These should be carefully analyzed and documented in detail in order to provide continuous effective production and operation.

Economic-Financial Information

Economic-financial information is also part and parcel of goods and services and their production and operation processes. This includes inter alia, cost of acquisition and of storage of raw materials, cost of storage of the produced goods, labour cost and maintenance cost of the installation and various other administrative and operational expenses. These should be carefully monitored in order to assure the rentability of the goods produced or the services provided.

So far, emphasis has been placed on inhouse information because sometimes this tends to be considered secondary, with unfortunate results.

Outside information is just as important and should be acquired, organized and monitored continuously according to needs.

Technical information on products and services, their raw materials and accessories, their production and operation processes can be obtained from scientific and technical literature (journals, books, abstracts, patent literature, handbooks, encyclopedias etc.) and from a plethora of specialized computerized databases. The same holds essentially true for economic-financial information needs. These too can be satisfied by the financial literature (stock market reports, consumer reports, market surveys of goods and services, trade and commerce statistics etc.), and a variety of computerized databases and services are at the disposal of the industry.

A final important point concerns the treatment and organization of this information. Inhouse and external information should complement each other and be organized in such a way that the required information can be made available on short notice and as completely as possible.

Information Dissemination in a Large Industrial Plant

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The objectives of an information centre in a large aerospace corporation is to keep the end users, mainly engineers, academicians, scientists, and managers, up to date in aerospace and related high technology areas, and to locate and obtain technical information needed by them to carry out their respective tasks whether that be research, design, or management.

During the past ten years, the Technical Information Centre of Israel Aircraft Industries (TIC) has been automating the management of its library and information retrieval services, with the intention of bringing the ability to find technical information to the desk of the end user. The system has been growing over the years to include the acquisition and control of periodicals, reports, books, manuals, and their amendments. Most of this work is being done on a CDC Cyber mainframe using in-house programmes developed by IAI programmers and TIC professionals, while the automation of the cataloguing, classification, and circulation procedures were purchased from an outside source. The challenge has been to incorporate and unify the various databases into a local area network which can be easily accessed and searched by the end user using existing facilities in the plant.

At present five separate databases covering various sectors of the TIC information are maintained on the CDC Cyber mainframe and can be searched by the end user (FICHE and MIXER are also transferred to an IBM mainframe).

1. PAKID (Periodical Acquisition Klaiming and Internal Distribution - PAKID means "clerk" in Hebrew), provides a wide variety of computer assistance in handling the approximately 2000 subscriptions to 1000 periodicals on behalf of 400 subscribers. (1)

2. FICHE, maintains the microfiche collection which contains technical reports obtained from NTIS, NASA documents, IEEE Conference proceedings, AIAA papers, etc. Every two weeks a bulletin of new reports is generated and distributed.

3. MADMAN (Manuals and Amendments Distribution Monitoring And Notification) was developed to monitor and control the 12,000 amendments received per year for 50,000 manuals relating to overhaul, maintenance, flight, etc. (2)

4. The MIXER system is a query application containing cataloguing, classification and circulation data on the books which are handled by the TIC. The database is updated only by data from LMS PLUS (see below).

5. LINGO is the last of the five CDC programmes and is used to manage our on-line ordering system. This programme allows us to prepare orders, make claims, and control our outstanding and received orders.

LMS PLUS, developed by TOP Systems Ltd (Tel Aviv) for use on a selective range of micro computers, is a program used by TIC to catalogue, classify, and circulate books. The input is general bibliographic data and necessary circulation data. This software allows us to search by title, author, and keywords, prepare lists, send overdue notices, etc. Data entry via a microcomputer allows the TIC to utilize highly specialized and versatile packaged software in a dedicated environment. This is excellent for entry and local inquiry, but has virtually no widespread multi-user possibilities outside of the TIC.

To get our 'electronic' information system to work we had to design a network whereby the mainframe and the micros would "talk" to each other and the various databases would be integrated into a system which is easily updated and easily accessible by the end user. To accomplish the objectives set, the following requirements had to be met:

1. close cooperation between the programmers of the micro and the mainframes
2. acquisition of a software package capable of uploading and downloading between the micro and the CDC mainframe
3. development of a software package to transfer data between the CDC mainframe and the IBM mainframe
4. education of the end users

Using this network the end user is supplied with information they need either upon their initiative or on the initiative of the TIC. The applications include:

1. On-line searching from an external host (DIALOG, BRS, INFOLINE, NEWSNET, AEROSPACE DAILY, etc.) by TIC personnel.
2. On-line searching of the five internal databases (available to end users).
3. Preparation of internal bulletins to inform the end user of new publications available in the TIC.
4. Preparation and transmission of an electronic daily newsletter dealing with aerospace to keep the end user up-to-date in the field. (3)

The end user is the key to the success of the network. If the content is not relevant, access difficult, and/or search procedures clumsy, the network will not be used. Therefore we have and are continuing to make every effort possible to learn in advance the needs, resources, and capabilities of the end users while developing online services. Educating the end user is also very important and is accomplished through advertising, public relation campaigns, and short lectures. A major contribution to the success of an 'electronic' information service, is the recruitment of the "information gatekeeper" who is an "information/computer minded" end user and/or intermediary between the TIC and other end users in his area of interest. This person is usually highly motivated to direct the information available to those who need, but who for various reasons do not make use of, the computerized service (4).

Cooperation between computer and information specialists has made it possible to transmit information to the subject specialist (the end user) via a local network using existing facilities. This new media of bringing information to the engineer, researcher, and manager is making headway and is proving itself as an efficient means of keeping them up to date. The goal of our education programme called "SBI" (Strategic Bibliographic Initiative) is to increase the end user's awareness of the fact that he can do a preliminary subject search, find books, reports and periodicals, or read a daily newsletter - all from a terminal on his desk.

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Invited Paper

National Information Policy- the Availability of CJK Records in the Australian National Bibliographic Network

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The Governance of ABN

The Australian Bibliographic Network (ABN) was established in 1981. It is a cooperative shared cataloguing network. The responsibility for policy making is shared between the National Library of Australia (NLA) and the Network Committee of ABN. The role of the Network Committee is:

> "to advise the Director General of the NLA on all aspects of the operations of ABN. Its function includes the development of policies and forward planning of ABN, the oversight of the work of the Standards Committee, review of the ABN budget, advice on the charging structure, advice on the priorities for functional enhancement of the software, and the regular review of operations and progress". (1)

Six of the eight to ten members of the Committee are elected democratically by ABN users.(2)

It is clear from the structure of governance that the final responsibility for the management of ABN rests with the Director General of the NLA because the Network Committee is only an advisory body. However, in reality, it is rare that the Committee's advice is not accepted by the Director General (3).

The second most powerful committee regarding policy making and management of ABN is the Standards Committee which is a subcommittee of the Network Committee. The role of this subcommittee is:

> "to advise the NLA on appropriate bibliographic standards for use in the ABN context. This advice is channelled to the Library via the Network Committee" (4).

Of the eleven members of the Committee, eight are elected by ABN Full Service users (5). This fact also enables fair and democratic participation in decision making. As a rule, the recommendations of the Standards Subcommittee are accepted by the Network Committee.

This management structure provides a good framework for balancing the interests of the NLA with those of the ABN users.

Factors Affecting the Policy Relating to CJK in ABN

Records for Chinese, Japanese and Korean (CJK) books in Romanized form were included in ABN almost from the time it was established. Cooperative Action by Victorian Academic Libraries Ltd (CAVAL) had a cooperative cataloguing scheme with a large database and it had included Romanized CJK records since the beginning of 1982 (6). When this database was loaded into ABN, the CJK Romanized records were also included. As far as

Romanization is concerned, CAVAL recommended to the Standards Subcommittee that the Library of Congress (LC) practice in transliteration, e.g., Wade-Giles for Chinese and Hepburn for Japanese.(7), be followed.

The National Library of Australia decided in December 1985 to add Romanized entries for CJK onto ABN and other ABN member libraries also followed suit. (8)

In 1988 the ABN Network Committee decided that "it is not feasible to put non-Roman script on ABN for the next 5-10 years" and that "incoming LC records are to be stripped of CJK scripts before being loaded onto ABN".(9) Accordingly, ABN began loading Library of Congress CJK tapes into ABN in 1989 but without the vernacular characters.(10) This decision was understandable, for in 1988 no library in Australia had East Asian script in its automated catalogue.(11) On the other hand, by this time the processing of East Asian scripts by RLIN, OCLC and UTLAS were operational and the 5 to 10 years projected date for the inclusion of CJK script in ABN reflected a very conservative view of progress in automation.

From this evidence it becomes clear that ABN had included CJK records in Romanized form years before the Network Committee decided to include CJK records only in transliteration. Thus, the Network Committee's decision only confirmed the status quo and reflected the realization that the technology at ABN, although not overseas, was not yet ready for processing East Asian scripts.

Another factor for not bringing forward the date of including CJK scripts in ABN was the lack of pressure from libraries during the early and mid 1980s. For example, in 1983 a survey by S. W. Wang revealed that there were only 32 libraries in Australia with Chinese holdings, and that among these libraries automation was not common (12).

Pressures for Policy Change

The attitude towards including CJK vernacular scripts in library catalogues has changed very rapidly during the past two to three years. One of the reasons for this is that the changing attitude of society in general towards East Asia. The trade and commerce potential with East Asia has been constantly emphasised by the mass media, and a much greater emphasis has been placed on East Asia in the educational system. The Asian Studies Council published a report "National strategy for the study of Asia in Australia" in which it sets the objectives that:

> "The number of students studying an Asian language as a mainstream subject to nationally agreed guidelines is 15 per cent of each of the total primary, secondary and TAFE student population and 5 per cent of the university and college student populations, by 1995, and 25 per cent and 10 per cent respectively by 2000" (13).

Obviously, when the teaching of one or more CJK languages is introduced at a tertiary institution, books and other resource materials also will have to be acquired and catalogued.

Prof. Ingleson in his report "Asia in Australian Higher Education" also emphasized the importance of including non-Roman scripts in automated library catalogues.

> "... Australia does not yet have an automated system for the cataloguing of non-Roman scripts... We have been advised that it would be possible to develop a module to add to ABN, which would make possible the display of vernacular scripts. We consider this a top priority for improving access to collections throughout Australia" (14).

Probably the most important factor in policy change was the realization during the late 1980s that because of the rapid change in computer technology, the processing of CJK vernacular characters is within the means of at least the larger libraries, even in Australia.

Thus, the pressure for CJK vernacular bibliographic descriptions in automated catalogues was growing rapidly.

In 1988 MacDougall surveyed the same libraries that S. W. Wang surveyed in 1983. Of the 27 libraries with Chinese holdings who responded, the vast majority indicated that there was a need for East Asian scripts in ABN (15).

At the "Exchange of Experience Seminar: Library Issues in Vernacular Material for Asian Studies" held at the Australian National University on 20 February 1989, one of the recommendations of the Seminar was to ask for financial support to investigate the possibility of including CJK vernacular characters in ABN. The Director General and the Deputy Director General of the National Library of Australia were also in favour of the recommendation.

The Committee of the Asia and Pacific Special Interest Group of the Australian Library and Information Association made a submission to the Working Party on Library Provisions in Higher Education Institutions chaired by Prof. I. Ross, that "ABN as the main database of Asian holdings in Australia, receive support to enable it to include entries in Asian scripts" (16).

MacDougall's survey, also revealed that in 1988 there were four libraries in Australia with Chinese language holdings of between 35,000 - 140,000 monographs, 5 libraries with between 2,000 - 10,000 volumes and 14 libraries with less than 1,000 volumes (17).

The number of libraries with CJK holdings are probably larger than those indicated by MacDougall's survey, as the survey only covered holdings with Chinese books. If the survey covered also Japanese and Korean books the holdings would have been probably substantially larger. Therefore, it would be worth surveying libraries with holdings of any of the CJK languages particularly in view of the fact that the number of courses in Japanese increased rapidly during the past 2-3 years and Korean is also being taught at least at two tertiary institutions.

The ABN Network Committee obviously could not ignore these developments, and as a result the ABN Office started investigating the "feasibility of redeveloping ABN to include multiscript capability" (18).

Effects of the Current Policy

While ABN still does not include CJK script records, Australian libraries are coping with the consequences of this policy in a variety of ways. In Australia, as in many other countries, the traditional procedure is to maintain separate catalogues on cards for each vernacular script, filed by the transliterated Romanized headings.

In 1990 all tertiary academic libraries in Australia with collections in CJK scripts have automated library systems. However, they still maintain a card catalogue for entries in the vernacular script. If ABN included CJK script records and if it could process them, Australian libraries could download them and display them at least at a microcomputer workstation, eliminating the need for card catalogues for East Asian scripts. Records in Romanized forms, in most cases, are already kept in computer readable form and are displayed in the Online Public Access Catalogue (OPAC).

Why should a library go to the trouble, expense and inconvenience of including the original native characters on the records when their Romanized version is easily obtainable? When dealing with this question a to distinction must be made between material in Chinese, Japanese and Korean scripts. Japanese and Korean bibliographic records in Romanized transliteration do not present great problems. From such records the book or other library material can easily be identified. The only problems are Japanese personal names if they are homophones, i.e. those that sound the same but are represented by different characters.

In contrast to Japanese and Korean, Chinese bibliographic records cause tremendous problems if they do not include the vernacular characters as well. Roman characters, as they are used at present in most Western countries, are not capable of representing Chinese spoken sounds without ambiguity, therefore it is difficult and often even impossible to recognize works in Chinese script from their transliterated bibliographic records if the record gives only the Romanized transliteration. (There are also non-Roman transliterations of Chinese script). Consequently, to avoid ambiguity Romanized manual catalogue records usually include in parallel fields the vernacular Chinese characters.

Another question also arises. Why should a library bother with the transliteration; why not just give the vernacular CJK characters? The problem with a description only in vernacular is that it is difficult to file. E.g., one Chinese filing order follows the order of the total number of strokes in each Chinese character, which creates a very complex filing system. It is much easier to file Chinese records by the Romanized headings. Furthermore, if the records are in computer readable form, Chinese vernacular characters also cause problems for word separation. Thus, the vernacular and Romanized descriptions complement each other, i.e. make up for each other's shortcomings. Consequently, in an effective computerized catalogue the records should include both vernacular as well as Romanized descriptions in parallel fields.

Another problem with transliteration is that for: Chinese, Japanese and Korean there are more than one widely used system of transliteration. For example, for Chinese, Pin Yin is used in the P. R. of China and Singapore, Wade-Giles in most U. S. and Australian libraries, and other transliterations are used in Taiwan. Thus, when Chinese characters are to be Romanized, the standards of transliteration must be considered. Unfortunately, as was shown

in the above examples, at present no single universally accepted standard exists for transliterating for either Chinese, Japanese or Korean characters. Standardization is moving at a very slow pace but it is moving forward. The Library of Congress is already "reviewing Chinese Romanization and looking at the possibility of changing to Pin Yin" (19) It is unlikely that LC and the other libraries in the U. S. with large holdings of Chinese material will change to Pin Yin unless the current Wade-Giles transliteration can be converted by the computer automatically at an acceptable cost.

Those libraries that wish to keep their CJK vernacular script materials also in computer readable form and display them on OPAC, have a number of choices:

1. Ignore pressure from the users, acquiesce into ABN's current policy and wait until ABN includes vernacular scripts in its database.
2. Join one of the national bibliographic utilities like OCLC (USA), RLIN (USA), or UTLAS (Canada) and enjoy the benefit of their CJK online cataloguing and information retrieval services.
3. Purchase a turnkey local system that already has, or is planning, a multiscript processing facility, e.g. URICA, DOBIS/LIBIS or LIBS100. However, none of these systems will allow shared cataloguing, but they would allow CJK script to appear in the Online Public Access Catalogue (OPAC).
4. Install a stand-alone microcomputer with software to handle one or more of the CJK scripts. This choice would make it difficult to maintain national standards.

If a library chooses option 2, the basic question is whether the library wishes to continue the policy of having a separate catalogue for each vernacular script or whether it wishes to combine all three CJK characters in one single sequence. In the former case, a Japanese library may consider the Japan CATSS (Japan Catalogue Support System) of UTLAS International of Canada for Japanese script material or a Chinese library may consider Chinese CATSS (20). In Australia, the choice would probably be one sequence for all CJK records, therefore OCLC and the Research Libraries Network (RLIN) could both be considered. However, there is a considerable difference between these two suppliers as far as their services and costs are concerned.

The RLIN became the world's first automated library cataloguing and information retrieval system for materials in Chinese, Japanese and Korean scripts when the Library of Congress, as a member of the Network, entered its first CJK record in RLIN in September 1983. The East Asian Character Code developed by RLIN became the East Asian Character Code for Bibliographic Use and accepted as the official standard in the USA (21). In 1989 RLIN had the largest CJK database in the USA. In November of that year, it had more than 530,000 records and each of these records also have Romanized fields (22).

About three and a half years later, OCLC entered the competition and in January 1987 made its newly developed automated network of Chinese, Japanese and Korean characters, known as the CJK 350 system, available to interested libraries. In December 1989 OCLC had over 310,000 unique CJK records in its database. Of these about 120,000 unique records contain CJK script; the rest are in Romanized form only, but are gradually being enhanced by native script characters (23).

K. T. Wei and S. Noguchi compared OCLC CJK and RLIN CJK mainly from the point of view of cataloguing and information retrieval, (24) and L. H. Hu evaluated these systems for their suitability to the University of Melbourne. 25 Nevertheless, it might be useful to remember the following points:

1. Neither of the workstations, OCLC's CJK 350 or RLIN's MultiScript Workstation (MSW), is a stand-alone workstation. They can perform cataloguing functions only if connected to their respective databases in the U. S.
2. They are both very useful for on-line information retrieval; both can be searched by Romanized characters, and RLIN can be searched also by vernacular script search terms.
3. OCLC provides an optional catalogue card production software package (annual license fee US$ 1000) so that cards can be produced on location. RLIN does not provide such a facility but it will supply CJK cards on request.
4. OCLC offers an optional CJK word processing package for an annual license fee of US$ 500. However, this software cannot be used for cataloguing purposes (26). RLIN does not offer word processing software.
5. RLIN's MultiScript Workstation allows subject search; OCLC's does not.
6. RLIN has an excellent CJK thesaurus which is an online, multi-indexed list of East Asian characters. It allows the checking of Chinese characters by radical, stroke count, Wade-Giles or Pin Yin Romanization, Kana readings, or modified Hepburn and McCune-Reischauer Romanization (27). OCLC has no such thesaurus.
7. OCLC's workstation has a standard PC keyboard capable of four phonetic and the Tsang-Chieh alphabet code input methods. RLIN has a special enlarged multiscript keyboard that allows only for character composition input method, but searching can also be done by Romanized form.
8. Original cataloguing of a Chinese or Japanese book by using a manual native script typewriter is, according to RLIN, five or six times more expensive than cataloguing an ordinary English book.(28).
9. In the RLIN database each participant library has its own records. In OCLC's database there is a single record for each unique title.
10. The initial "startup" cost is not the most important cost consideration for either system. With OCLC one has to consider the annual license fee (US$ 14,000 about A$ 17,000) (29) and with RLIN the annual telecommunications cost which in Australia (for a dedicated line) would be about A$ 65,000 (30).

At the time of writing there is no operational OCLC or RLIN system in Australia. In 1989 the University of Sydney had the RLIN system on trial but the experiment was abandoned because there was no established mechanism to download items found in RLIN automatically into ABN and records found had to be created in ABN again. Furthermore, personal names and subject headings found in RLIN could not be automatically used without verification for original cataloguing on ABN. This meant that authority work still had to be done. The conclusion was that at that time RLIN was unsatisfactory as a cataloguing tool (31).

In August 1988 the Australian National University bought OCLC's CJK 350 system but it encountered technical problems during in-house installation and the system was sent back to OCLC. After this experience agreement was reached between the ANU and OCLC that OCLC would install and test the system before delivery (32). The University of Melbourne also bought the OCLC CJK 350 system in 1990 (33) and other academic libraries with large CJK holdings will be watching the progress of its implementation with great interest.

So far no turnkey automated system in Australia is able to process CJK scripts. URICA can be enhanced for this purpose but the vendor is not prepared to demonstrate it to individual libraries in Australia. They think the market is not large enough for it (34).

Victoria College in Melbourne installed a Chinese cataloguing system on a personal computer to be used also as an OPAC. The software was developed by the Library of the Hong Kong Polytechnic. Unfortunately, the catalogue records do not adhere to standard AUSMARC format.

Implications for Standardizing CJK

No matter what existing systems Australian libraries opt for, problems will arise with standardization because none of them use AUSMARC format. OCLC uses OCLC-MARC which is about 90% USMARC, and RLIN follows USMARC. UTLAS uses the MARC format of the country for which the vernacular script record was created, e.g. Japan MARC for Japanese libraries, and Chinese MARC, developed by the National Central Library, Tapei, for Chinese. Finally, CJK systems used on turnkey local systems or on stand-alone microcomputers may not confirm to any MARC format at all.

This year ABN sent out a questionnaire to ABN users in order to ascertain what proportion of them would support a change from AUSMARC to USMARC format. If in the near future ABN changed to USMARC, it would eliminate at least the need for conversion from US to AUSMARC format (after all AUSMARC records were converted to USMARC). But the problem of diverse transliteration standards would still remain. The more local turnkey systems and PC based systems are introduced for processing CJK records the more scope there will be for the diversification of various standards.

Conclusions

It is evident that there is no choice for ABN but to change its policy on the CJK vernacular scripts and include them in its database as soon as possible. Once the policy is decided upon, ways and means of implementing it will follow.

Benefits arising from this change in policy include:

a) elimination of the need for joining overseas bibliographic utilities or for introducing local turnkey or PC based CJK processing systems that are not connected to ABN

b) considerably reduce the cost of cataloguing CJK records for ABN participants

c) greatly enhance standardization in a number of areas e.g., for transliteration, at least within Australia.

d) facilitate research for the academic community by making CJK records in ABN more meaningful and more accessible.

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Electronic Publishing

Electronic Publishing - Status, Trends and Prospects

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The term electronic publishing has exploded into the literature and into the terminology of many organizations over the last few years as the hardware and software involved in these activities becomes more accessible (1, 2). As a consequence "electronic publishing" means many things to many people. In 1983 the Working Group in Electronic Publishing (a group composed of members of varied interests) defined electronic publishing as

> "A form of publishing in which information is distributed using electronically encoded signals stored for processing on computers or other means and displayed for viewing by users either on a screen or as a printout."

This now involves a number of activities and I prefer to use the term electronic publishing as a general description of

- electronic publishing of traditional printed publications;
- electronic distribution of information in both electronic and print form;
- true electronic publishing in the electronic media.

Electronic publishing has matured dramatically over the last five years as, like many other computer related technologies, it has become widely available to the general public and corporations. Electronic publishing is a classic example of how a traditional activity has developed as the computing industry has grown and matured, adapting innovations in that area to its particular application. It has developed to its present form utilizing the computational capability, the storage capability and communications capability of the computing or information technology industry. Therefore, the development of the electronic publishing industry has closely paralleled the development of the computing industry.

In this discussion the industry will be divided into two categories:

1. Electronic publishing for primarily print based publication.
2. Electronic publishing for primarily non-print based publications;

Print Based Electronic Publishing

Print based electronic publishing has evolved historically from traditional publishing activities. Most printed materials prepared electronically cannot be distinguished from those prepared by traditional methods and it is the production technology which has made the difference. Like most computer based technologies, the technological development has shown exponential growth. Where the Guttenburg Press (1450 A.D.) made printed material affordable for the general populace, the easily accessible desktop publishing phenomenon, which developed in the 1980's, has led a similar revolution in the publication of printed materials.

The print based electronic publishing industry originated in the late 1960's when the capabilities of computing systems allowed text to be captured from the keyboard and then manipulated to give the correct format for publication. These were mainframe based systems which excluded all but the very large and specialized organizations from using this expensive technology. The development of word processing software packages and graphic packages through the 1970's prepared the software platform from which the current wave of desktop publishing systems could launch themselves. In 1985 the Apple Computer Company announced a publishing system whose hardware platform was the Macintosh SL with 152 kilobyte main memory, 10 megabyte built - in hard disk, 400 kilobyte floppy disk storage and a 12 inch display unit. The major breakthrough was that this publishing system was based around the "What You See Is What You Get" (WYSIWYG) user interface. This, together with the use of a mouse, icons and pull down menus, made the system accessible to a non-expert computer user. Professionals who had traditional publishing expertise were no longer locked out of the technology of the publishing process. The result was an explosion in the demand for these systems and a resultant shortage of trained professionals.

The central computer was also supported by an impressive array of peripherals. The Apple LaserWriter was a true image setter with a resolution of 300 dots per inch (120 per centimetre). The machine did not require special paper or chemicals and was based on the well established photocopying technology. This printer was designed around the powerful 32 bit MC 68000 microprocessor and supported by the PostScript page descriptor language. This high level software language contains a comprehensive array of commands to handle line art and half tone graphics. It operates on a model of each page and can perform all image transformations on a large range of output devices using the same page description. This assured that the system would not become obsolete due to a change of output device. The language has now been greatly expanded and supports a large number of typefaces. It also handles graphics which may be scanned into the document by means of cheap scanners. Apple also marketed a very inexpensive network system called the Appletalk personal network, which allowed work stations to share common resources e.g. image libraries etc. The Macintosh based publication system has rapidly developed since its introduction and now boasts full colour publishing capabilities based around the Apple Macintosh. These types of systems are now supported by a vast array of visual images available on CD-ROM.

For example, the FID/CAO Regional and Committee Newsletters are published using a Macintosh desktop publishing system. The artwork for the Newsletter banners was designed by a graphic artist (Ms Robyn Kress), tutor in Visual Information Management at Victoria

College, Australia, using the graphics package Adobe Illustrator 88. These images are stored on hard disc (and of course on a back up floppy) in an electronic graphics library.

When contributions are received from Corresponding Members worldwide, the text is word processed into machine readable form using a Macintosh Plus and the Microsoft Word 4.0 word processing package. Any graphics or visual material are either scanned using a Microtek MSF-3000 Image Scanner or reproduced using a suitable graphics package. (e.g. Adobe Illustrator 88 Version 1.83).

When all contributions have been converted to machine readable form, the text and visual materials are transported into a page layout package (Aldus Pagemaker Version 4.0). The document can then be manipulated and the newsletter composed to prepare camera ready copy for publication.

The printer used to produce the camera ready copy is an Apple LaserWriter II INTX laser printer with a resolution of 300 dots per inch (dpi). If further resolution is required (as was for the production of the FID/CAO letterhead) the machine readable copy can be sent to a commercial Linotronic printer (resolution 1200 dpi) on a floppy disc.

The camera - ready copy is then sent to a commercial off-set printer (as in the case of the FID/CAO Newsletter) or photocopied in-house (as with the FID/CAO/ET and FID/CAO/II Newsletters).

The hardware and software used in this system is:

Macintosh Plus with 40 Mbyte hard disc.

Microtek MSF-3000 Scanner

LaserWriter II NTX laser printer

Microsoft Word 4.0

Aldus Pagemaker Version 4.0

having a total cost of A$18,700. This equipment is used in the Applied Science undergraduate programme in Scientific Information Management at Victoria College (3).

Such flexibility and accessibility is having a significant effect on the publication industry. High quality documents can now be prepared relatively easily and economically. Also, documents and publications can be modified or customized to suit a particular application. For example, academic textbooks are now being customized (4,5), incorporating local material to suit local demands. This technology allows academics to compose textbooks for their courses, choosing published articles and excerpts at will, incorporating their own material and publishing the textbook in an extremely limited edition. Publishers are adapting to this phenomenon (4) and it is estimated that "custom publishing" constitutes 10% of the US college textbook market and is increasing rapidly.

It must be emphasized however, that desktop publishing systems are merely a tool to aid the publication process. A good hammer does not make a good carpenter. The skills of writing, graphic design, page layout etc. are still required. An unfortunate illusion is that, with the availability of very impressive images and fonts, any person can now produce a good publication very quickly. Like most computer aided tools, it enables a bad job to be done more quickly. Most certainly the skills in the area of writing and design are even more in demand now that the publication process has become accessible to many. In Australia, information professionals are now being trained in the areas of writing and information presentation as a routine part of their courses (3).

Although still in the developmental stage, the field of desktop publishing will most certainly develop further and become less costly. The software will become more sophisticated and we will see the appearance of expert systems in design that will aid the novice publisher. The so-called "intelligent" or "active" document has arrived (8-11) which embeds specifically written programmes in documents to allow non-technical users to modify and reconfigure them. For example, the documents could work closely with spreadsheets like Lotus 1-2-3, letting users generate charts and graphs from spreadsheet data. A document can also be written taking into account external factors. For example, engineers could automatically be warned if they enter values that are outside a certain design specification. The opportunity to repackage information for specific users will expand, especially in the corporate sector (1, 12-14).

The challenge to the information professional still remains the presentation of the message, which after all is the most important part of the information package.

Another emerging issue is the ownership of the information product or the intellectual property contained in that product (15,16).

Electronic Publishing for Non-Print Based Materials.

This area has exploded over the last two decades and is showing no sign of abating. The industry grew out of the computerization of the print based electronic publishing industry in the late 1960's. The machine readable magnetic tapes that were used in the publishing process were recognized as the basis for the value-added activity of information retrieval. This led firstly to off-line batch mode computer retrieval from a large database of material which then evolved into the proliferation of products available today. Initially, three kinds of services were offered:

- Printed indexes;
- Selective dissemination of information (SDI);
- Retrospective searching.

All these services survive today and are the bread and butter of on-line retrieval services.

By the early to middle 1970's, telecommunication systems had reached a standard where remote computers could connect via modems and the public telecommunication system to the very large central data storage facilities required for these types of data bases. It was possible to interrogate the data base at a distance and extract the information required which could then

be downloaded to the user's terminal. A document delivery service was provided for hard copy references or text. These services were commercially introduced in the early 1970's when large capacity storage, high speed computers, terminals, telecommunication systems and software had developed to the stage of coping with the technical problems of interrogating a large data base at a distance.

On-line information retrieval services have expanded to be a multi-million dollar business world-wide. The services provided by these organizations have expanded and evolved to cater for the diverse needs of industry and business. Many data bases are full text and updated daily. The two main on-line data base vendors within Australia are Ausinet and Australis.

Ferntree Computing (formerly ACI Computing Services) has been in the electronic publishing business since the early 1980's. An excellent description of the evolution of the service and a discussion of the financial, social, technological and marketing issues was given by Mr Leigh Baker, the then Manager of the Electronic Publishing Division of ACI in 1987 (17).

ACI entered the online information industry in the late 1970's with AUSINET which initially marketed traditional bibliographic databases to the established information markets in Australian libraries and other information intermediaries operating in information-conscious organizations such as CSIRO and academic institutions.

As the decade progressed, it became obvious that a lucrative market lay with business. By the middle of the 1980's, a number of full text electronic editions of hard copy publications were introduced, (e.g. The Bulletin, Business Who's Who of Australia) and these have been further supplemented by other electronically published products.

The highly competitive economic nature of this industry was highlighted in 1986 when ACI divested itself of many of the uneconomic scientific and technical bibliographic databases. These discarded databases formed the basis of CSIRO's Australis service which has struggled to establish itself in the market place (18).

Ausinet provides online services to a moderately large number of databases which embrace:

- Full text databases
- Directory databases
- Reference (or bibliographic) databases.

The full text databases are electronic editions of Australia's most respected newspapers and magazines and include:

- The Australian Financial Review (updated daily)
- Australian Business (updated weekly)
- The Bulletin (updated weekly)
- Business Review Weekly (updated weekly)
- The Sydney Morning Herald (updated daily).

The service is business orientated in response to market demands.

These services are also supplemented by other national and international information retrieval services including STATEX (Australian Stock Exchange), PROFILE INFORMATION (international media) and INVESTMENT PLUS (international business analysis).

Ferntree Computing also provide corporate electronic publishing services and prides itself in the ability to respond to industries' electronic publishing requirements. Larger organizations are turning to in-house electronic publishing to solve their documentation problems (19, 20).

Traditional on-line retrieval systems were expensive and used an interface which required trained information professionals and consequently inaccessible to the general public. Videotex systems were developed to answer these problems. They provided a cheap and easily accessible interface into an on-line data base system which was menu driven and supported by graphics. These systems were accessible from the home via the telecommunication system using a very simple keypad and a television set. The data bases were strongly hierarchical in nature and consequently brought the problem of users becoming lost within the system. However, they have developed to a stage where they now have gateways into the more traditional on-line data bases. Therefore, videotex gives an easy access for the non-professional into the less accessible information data bases. Videotex systems have had a mixed success world-wide. They have a wide application in France as the telephone directory is published electronically and accessed via videotex. In other countries success has been more mixed. For example, in Australia the local videotex system (initially called VIATEL) has been a limited success.

The biggest impact upon non-print based electronic publishing was the advent of the CD-ROM in the 1980's. These write-once read many optical digital disks have an exceptionally high storage capacity when compared to floppy disks and can accommodate 700 megabytes of memory.

The impact of CD-ROM on the online information industry is well documented and will not be considered here. The major impact is that it has individualized the search process and has made it available to the general user rather than via an information intermediary as in the past.

The large data storage capacity of the CD-ROM has allowed the development of what has become known as hyper-media. With this information product, electronically published data (numeric, text, visual and audio) can be accessed and manipulated using a software package that is also electronically published often on the same CD. This allows the user to develop their own information product using electronically published data as the source.

An example of this is the Australian developed product Supermap. The product has two components:

- a set of census data (e.g. Australian 1986 census data)
- a statistical/graphics software package.

The package allows the user to access and analyze the available data as they wish and present the results in a number of graphical formats.

An inhibiting factor with these types of products at the moment is their cost of production. Costs will dramatically decline as read/write optical memory products (which are now starting to appear on the market) become more generally available. The initial problem of lack of standards is being addressed.

The marriage of computers and the telecommunication system has transformed the early form of electronic mail (the telegraph) into the burgeoning traffic of today. Electronic mail is another term whose meaning varies depending on the context and can include FAX, teleconferencing, voice messaging, communicating word processors, computer conferencing, as well as the narrower application where a computer system with specialized communication software can send digital messages (mail) to other computers (or an actual digital mailbox) via a data communication network. Electronic mail is the electronic form of the scribbled note, memo, letter, notification, announcement, etc. that is the backbone of inter or intra organizational communication.

There are three possible modes of sender/receiver communication.

- point to point, where the message is only sent when the two terminals are connected (sometimes called the "phone mode").
- store and forward, where the message is stored until the connection is made.
- the mailbox, where the message is stored in a mailbox and this is accessed by authorized users.

The communication can be between both human and machine users.

Electronic mail systems can be incorporated into an electronic publishing system, but at the moment are merely file transfer media at best. Despite its short comings electronic-mail is being increasingly used in organizations to cut costs and time. For example, it is commonly used in libraries for inter-library loans communication and increasingly for documents delivery (21,22). The trend in computing is towards integration of technologies and the future will see this develop further.

The Technology Management project in the Faculty of Applied Science at Victoria College, Australia, is utilizing all forms of electronic publishing described above. This project is developing integrated higher education programmes for students from industry who are in full-time employment(3).

The course is self-paced and distance learning materials are produced in-house using an Apple Macintosh desktop publishing system. The materials can be easily modified, thus radically reducing the time and cost required to update the course material or produce a course for a particular industrial client.

Mature age students in full time employment must be provided with 24 hour access to course material to allow them to adapt their educational experience to their demanding professional and private life. The courses are supported by a Computer Managed Learning (CML) software package (23). As well as administering the student's course, this package provides a large amount of electronically published course material and assessment tasks that the student can access via the telecommunication system 24 hours per day.

The system supports an electronic mail facility which provides a 24 hour communication link between the students and their tutors. Students' work in most cases is not produced in hard copy, but is prepared on the students' computer and transferred to the tutor's mail box by electronic mail. The tutor can then return the corrected material to the student electronically. This communication link facilitates communication between students and staff, who often have difficulty in contacting each other by more conventional methods.

The desktop published self-paced print materials are supported by other electronic published products such as CD-ROM, Videodisc and Computer Aided Instruction (CAI) packages.

This project is revolutionizing the delivery of higher education courses in Australia and one of the major tools used is the electronically published information product.

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Electronic Publishing in Japan - a Review in 1990

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Electronic publishing, a vaguely defined area of activities and vaguely defined scope of products, consists of electronic or computerized processing of text, images, graphics for publication in an electronic format as well as traditional printing on paper. As it is vague in scope, the topics of this paper are diverse.

Technological developments related to electronic publishing have been rapid in Japan. Activities in various organizations, both in the private and public sector, are many and interrelated.

1. Japanese Data For Electronic Publishing

An enormous amount of digitization of Japanese text is currently being done by word processing. Word processing machines are sold in millions every year. However, digitized data is not yet fully utilized because of technical problems such as incompatibility between word processing packages, personal computers, and mainframe computers. Another major obstacle against the full utilization of digitized Japanese text is the variety of complex requirements for Japanese printing composition. This problem is characteristic to correct Japanese printing convention. In other words, the Japanese printing culture has a strong relationship to the Japanese language.

1.1 Background

The major topic of this paper concerns the electronic processing of Japanese text and their printing composition. In the last 20 years, computer processing of Japanese script has been developing with extraordinary speed and acceptance, and huge amounts of Japanese text are now being digitized. For example, major Japanese newspapers are now fully printed by Computerized Type-Setting (CTS). Toppan Printing, one of the leading printing firms in Japan, discontinued using the movable type made of lead, and about 80% of their products are now set by CTS. The remaining 20% is set by manual photo-typography. Recently, CTS has advanced to the printing of comics; weekly magazines that were previously excluded from CTS processing.

1.1.1 Computerized Type Setting (CTS)

Document processing of Japanese text is categorized into three groups:

- Document processing in the printing industry;
- Desk Top Publishing (DTP) among corporate bodies;
- Word processing for personal use.

1.1.2 Document Processing in the printing industry

The technology of document processing in the printing business is represented by computerized type setting. There are several major manufacturers of CTS systems in Japan. The market leader is Shaken, which has developed excellent fonts since the period of manual photo-typography, and has been the de-facto standard in Japan since printing composition moved into the computerized phase. Other specialized manufacturers of CTS systems include Morisawa, Fujitsu, and NEC. Predictably, there still exists incompatibilities between these CTS systems. Until now, there has been no compatibility between fonts of various CTS system manufacturers . However, the Japan Federation of Printing Industries established an industry standard for fonts in 1988, which is now expected to be applied by all manufacturers who deal with fonts.

Most CTS systems currently in operation are mini-computer-based. Newspapers and major printing companies who require mass processing of data have their own CTS systems based on mainframe computers. The CTS systems on mainframe machines are designed to process the printing composition of dictionaries, encyclopaedias, product catalogues, directories, etc.

Although CTS data of this kind is often applied to produce CD-ROMs as a second product, there remains little compatibility among CTS data.

1.1.3 Desk Top Publishing (DTP) among Corporate Bodies

In 1988, there was a substantial rise in interest in desk top publishing in Japan following promotion of DTP in the USA. Now there are many software and hardware systems for DTP including turn key products in the Japanese market for processing Japanese documents.

DTP technology is also important to printing companies. Japanese printing firms apply DTP technology to printing materials such as weekly magazines, where layout and style have to be highly flexible and text-editing has to be done in a very limited time. For example, both Dai Nippon Printing and Toppan Printing installed DTPs in the offices of publishers, and these are connected to the printing centres by telecommunication links.

It seems that as yet there is little success in implanting the capability of handling Japanese language into DTP systems based on the English language. Transformation of English DTP into Japanese DTP is not as simple as it seems at a glance, because of the differences between the English and Japanese languages. Requirements of Japanese printing composition and requirements for handling Japanese text should be assimilated into the system design of Japanese DTP. For example, character set/code of two bytes, input and output of Japanese scripts including Kanji (Chinese characters), and particular printing conventions controlling the composition must be built into the DTP system design.

1.1.4 Word Processing for Personal Use

In contrast to word processors in the USA (which are mostly based on personal computers (PCs)), Japanese word processing machines (a variation of personal computers solely devoted to word processing) are more common. "Ichitaro" is the name of the best selling word processing software on sale with millions being used on personal computers.

The top priority of a word processor's function is to provide quality printing, and there are word processors with special key-boards for the input process. These word processors are relatively cheaper than personal computers when considering their rich capabilities and functions such as special keyboards for efficient Kana-Kanji conversion etc. An enormous number of word processors have been sold in Japan. Compatibility among word processors is also a problem in the exchange of the resulting documents in machine-readable form. At present, only character codes can be exchanged among various word processors as a MS-DOS file.

1.2 Characteristics of Japanese Printing Composition

1.2.1 Japanese Characters

Scripts used in Japan are: Kana (Hira-kana and Kata-kana) as phonetic scripts that are used in conjunction with Kanji (Sino-Japanese). When there is no proper Kanji to express concepts, Hira-kana is used to describe sound. Kata-kana are used in special cases for imported words such as "Television". Kana can be expressed on computer by JIS X0208 Code of the Japanese Graphic Character Set for Information Interchange that conforms to ISO.

When character codes of JIS X0208 are used with ASCII it is so cumbersome to process that the Shifted JIS code is used. The Shifted JIS is the majority of character code in personal computers in Japan. In Japanese printing, the width of the character/ font of Hira-kana and Kata-kana are basically uniform, being the width of Kanji. However, the pitch between fonts may be extended or shortened according to composition requirements that will be introduced later.

1.2.2 Vertical and Horizontal Composition

There are two types or methods of Japanese composition. One is vertical composition, unique to oriental materials. The other is horizontal composition, similar to Latin materials. These methods are most common in Chinese and Korean documents. Most general documents use vertical composition, however, documents that include Latin alphabets or numerics use horizontal composition, as in the case of scientific journals or office printing. The differences between vertical and horizontal composition is not only the rotation of the font 90 degrees, but also the change in the expression of the text. There are two methods for a text string of Latin alphabets: one rotates, the other does not. In other words, one uses the Latin alphabet as a part of the Japanese text, the other uses the Latin alphabet in the horizontal composition. In the vertical composition, chapter numbers are in Kanji numerals. Arabic numerals are rarely used for chapter numbers. In Japanese writing, punctuation marks and small Kana, such as double consonants and contracted sounds, are used to support the description of pronunciation.

These small scripts look strange when they are rotated 90 degrees for changing composition from vertical to horizontal and vis-a-vis there are two types of fonts for vertical and horizontal composition. However, there is no distinction in the JIS Kanji Code for vertical and horizontal compositions.

1.2.3 Ruby (Japanese Ruby)

Ruby (Japanese Ruby) is used to express the pronunciation of a Kanji script or text. They are attached to the right hand side of a vertical text, above a horizontal line.

Each Japanese Kanji (Sino-Japanese) has its pronunciation according to its Chinese origin or Japanese origin or unique pronunciation according to the Japanese language. Japanese pronunciation is relatively simple so that there exists many characters that have same pronunciations. For example, there are more than one hundred characters that have the same pronunciation in the JIS X0208.

Japanese Ruby plays an important role in distinguishing the pronunciation of Kanji in a text string. Ruby in Kata-kana is also attached to Latin character strings as their pronunciation, or Ruby in Latin character, is attached to Japanese text to specify the original spelling of the word.

Font for Ruby is normally half the size of the main character. Therefore, two Hira-kana half the width of Kanji are attached to the main character. In some cases, there are three Ruby characters to one main character. Composition then becomes very complex. One overflowed character in a three-character-Ruby causes special attention. At the top of line or in the end of line, the floated ruby (and the closing bracket) should be taken care of. At the same time, special care should be taken to accommodate the combination of Ruby with compound words or phonetic equivalents (false substitute characters) to which the length or the width is not equal between the combination. Ruby is allocated space(s) to match the width of the main string. However, Ruby is floated in the case of more than three Ruby, and spaces are allocated in the main character string to match the width of the overflowed Ruby. There is no authoritative convention for allocating Ruby or allocating spaces to the main string, and editors or printers select their options according to their local conventions.

1.2.4 In-line Notes (Warichu)

Notes appearing in the text are called "In-line notes" and are normally composed in smaller characters. When they are set in the text, they are set in two lines within the width of the main line. The two lines for the inline notes are kept the same length as much as possible. When the inline notes run-on to the next line, each two lines of inline notes are set to be the same length. Examples are descriptions of pronunciation in a dictionary.

1.2.5 Area Specific Justification (Jiwari)

There are composition rules for the correct appearance of tables. One typical rule is applied in the treatment of headers or titles of tables. The length of a header is adjusted to match the whole length of the table. For example, one space is set between each of four character headers to be set in a seven character space. This method is often applied to directory entries for a balanced appearance of surnames and given names that are of various lengths.

In contrast to the above case, when the string length is shorter than the space of a header, the allocation of characters in a header may vary. There is no particular rule for this case and is treated according to the aesthetic sense of the editor or printer.

1.2.6 Mixed Type Setting of Latin and Japanese Characters (Wa-Ou Konshoku)

Latin alphabets are occasionally used in Japanese text. They appear frequently in scholarly papers. Arabic numerals are treated in a similar way to Latin alphabets. It is natural to use Latin characters in textbook of English language, of course.

Normally there is no space in Japanese text. However, space of a quarter em (a unit of length for printing) is set between the Japanese string and the Latin string. Naturally, Latin strings such as English text are set according to the composition rules of English text.

One of the specific characteristics of Japanese characters is that they are of the same width, or height. When Latin characters are used in Japanese character strings, particular categories of Latin fonts are chosen such as wide-width, similar heights between upper and lower characters or fonts that have similar curves to Japanese characters.

It is elegant to align the centres of Latin alphabets and Japanese Kanji characters in one line. However, there are Latin alphabets that extend their shape below the line or above the line such as "y", "j", "k", "h", etc. When the two centres are matched to the alignment line, many of the Latin alphabets go below the base-line of the string. In these cases the base line of the Latin character string is shifted slightly upward. There are Latin character fonts designed to match the centre or the base line of Japanese characters.

1.2.7 Horizontal-in-Vertical (Tate-Chu-Yoko)

It becomes complicated when a Latin character string appears in a vertical composition. Sentences of Latin characters are left as they are in the vertical string, but symbols in Latin character such as "AM" for time and short character string like this are rotated as done for a Kanji string of horizontal composition. In this case, Arabic numerals in a half size may look so ugly that they are treated as one Kanji character, or changed to Chinese numerals. Two Arabic numerals are set into the space of one Kanji character. This treatment is followed up to three Arabic numerals, but a string of four Arabic numerals is too long, and cannot be placed according to this technique.

1.2.8 Line Holding Rules (Kin-soku)

There are many line holding rules in Latin script composition. Characters which cannot be placed at the beginning of the line are the repeater marks, punctuation marks, closing bracket, double consonants, contracted sounds and symbols in general. Characters that cannot be placed in the end of the line are the opening bracket, right arrow etc. To conform to the line holding rules for the beginning of the line, the character concerned should be left to the preceding line or put forward to the next line. The converse processes take place in applying the rules for the end of line.

As mentioned above, the pitch of the character is equal in Japanese character strings and the length of lines are also the same. However, when the line holding process is taking place, the rule is not applied. In this case, the number of characters in a line is changed to keep the length of one line the same as that of others. In other words, spaces are allocated between characters to accommodate the left-off or kept-in characters. Adjustment may be applied before or after symbols in a line. If there are no symbols in a line, the pitch of all the characters are affected. Punctuation marks are hung to the last line and never appear at the top of the line. There is no authoritative rules to cover the line holding rules in Japan and editors and printers apply their local conventions.

1.2.9 Need for Style Manuals and Standards for Authors

There are similar conventions in other Asian languages and there are totally different conventions and rules in each country. In the U.S.A. there is the "Chicago Manual of Style" to guide authors, editors, and printers in English text. It is desirable to have this kind of manual for processing the full text to print and convert this into databases. Each printer has their own style, but their style may not follow commonly applicable rules or conventions.

Composition rules have been established to make text readable for ordinary people. These have accumulated over a long period of time with or without logical background, or according to cultural customs, or depending on aesthetic sense. In other words, they represent the printing culture or the culture itself and change as the culture evolves. For example, printing composition rules have changed drastically since CTS was introduced superceding manual movable type. It is still changing in this age of the computer. It is necessary to establish a common set of composition rules in a universal framework with respect to each language, or to establish a common conversion procedure between different composition rules for universal access to full text data resources.

1.3 Database Production in Japan

1.3.1 MITI Database Directory

MITI, the Japanese Ministry of International Trade and Industries, started to compile the "Database Directory" in 1982 . In the 1990 annual volume which includes data for the year of 1989, there is a total of 3,096 databases registered with duplications, which are served by 211 organizations, most of them private.

"Database White Paper, 1990", published by DPC in July 1990, reported the number of registered databases, unique databases available through online search services and the number of registered Information Retrieval (IR) service enterprises in Japan.

Databases Accessible in Japan

	1982	1983	1984	1985	1986	1987	1988	1989
Registered DBs	604	916	1242	1702	1959	2440	2858	3096
Unique DBs	456	679	924	1289	1483	1795	1964	2128
Regtrd Enterprises	42	58	78	100	121	137	194	211

Database Director (and Database White Paper) summarizes the number of unique databases accessible in Japan through online search services as follows.

Number of Unique Databases in Online Search Services in Japan

	1982	1983	1984	1985	1986	1987	1988	1989
Foreign Database	334	522	725	1008	1187	1370	1436	na
Japanese Database	122	157	199	281	296	425	528	na
TOTAL	456	679	924	1289	1483	1795	1964	2128

In 1988, there were 1436 databases originating abroad and accessible in Japan. Databases provided by foreign IR services such as DIALOG are included as agents/ vendors registered their scope of services. A steady increase in database provision is shown for both foreign and Japanese databases.

Average Increase of Unique Databases

	1982	1983	1984	1985	1986	1987	1988	1989
Foreign Database	334	522	725	1008	1187	1370	1436	na
Annual Increase(%)	156.3	138.9	139.0	117.7	115.4	104.9	na	
Japanese Database	122	157	199	281	296	425	528	na
Annual Increase(%)	128.7	126.7	141.2	105.3	143.5	124.2		

The average annual increase in the number of Japanese databases was 127% over the seven years from 1982 to 1988. Database provision is reported in the Directory. However, the use of online IR services is not included. The number of Japanese databases (528 in 1988) does not include those produced in the Japanese university community, which will be reported in the next section.

1.3.2 Databases Produced within Universities

Since 1987 an annual survey has been conducted by the NACSIS on database construction/creation within the university community in Japan. As of September 1989, about 1,000 were being constructed in 521 universities.

In the preceding survey, at the end of 1988 the number of databases was 850 from 518 universities. An increase of 18% was found between these two surveys. There are two reasons for this increase. One is the actual increase of database construction activities and the other is that awareness of the survey produced a better return ratio for the questionnaire.

Database Construction within Universities

	January 1989		September 1989	
	Universities	Databases	Universities	Databases
National universities	95	549	96	601
Municipal universities	38	17	38	28
Private universities	358	162	358	226
Inter-university research institutes	14	6	15	94
Other institutions	14	54	11	53
TOTAL	518	848	521	1002

Types of Databases Constructed within Universities

Textual Databases	
Full text	63
Full text and bibliographic data	14
Bibliography	207
Abstracts	69
Dictionary, directory	18
other	73
Subtotal (Textual Databases)	*444*
Combination of Textual and Other forms	
with Numeric data	134
with Numeric and Images	58
with Images or Graphics	22
other	2
Subtotal (Combination)	*216*
Numeric Databases	251
Numeric & Images	54
Images, Graphics, Voices, & Programme	15
Other	8
TOTAL	1002

Nearly half (44%) of the 1,000 databases being produced in 1989 were textual databases. However, there has been no statistics yet on the data volume measured by the number of records, the length of records or number of bytes per record, etc. Of the databases available, 25% are numeric and nearly 150 databases (15%) include images and graphics. The number of full text databases being produced is only 77 (7.7%). All the databases are being "publicly" accessed within the university community. The majority of textual data on campuses, such as manuscripts, are not yet offered as databases.

1.3.3 Bibliographic Databases

Although the main activities of information search services is with financial and business data, such as the stock market information, investment, etc., bibliographic information has been a basic core of the database business. For example, most of the JOIS databases (other than JOIS-F), the leading Japanese IR service, now provided world-wide, is bibliographic or abstract databases.

The Japan MARC, produced by the National Diet Library (NDL) Tokyo, is a machine-readable national bibliography and the Japanese equivalent to the Korean MARC or KOR-MARC which is produced by the National Central Library in Seoul.

The Japan MARC covers national imprints of current monographic publications in Japan. NDL is defined by law to serve the National Diet (Congress) but is also the de-facto national central library leading the nation's library services. The Japan MARK includes more than 60,000 monographs each year and there are more than 40 subscribers of the Japan MARC tapes who utilize the bibliographic data either for their own use, cooperative purposes, or redistribution. It is the genuine core of national bibliographic control. In 1989, NDL started the distribution of the Japan MARC serials.

J-BISC, a CD-ROM version of the Japan MARC, is sold by the Japan Library Association, and in 1990 the number of subscribers exceeded more than 500. A large proportion of the subscribers are university libraries. It is expected that the Public Libraries will subscribe J-BISC for their local cataloguing tasks without the network facilities or a substantial computer facilities.

J-BISC Distribution

University Libraries	44%
College Libraries	12%
High/Secondary School Libraries	4%
Public Libraries	17%
Corporate Libraries	17%
Others	6%

NACSIS-CAT, a union catalogue database of holdings of 140 universities in Japan, records more than 3.9 million volumes or 1.3 million unique titles of monographs. The volume of serials record in the union catalogue are 160,000 titles and about 2 million holding records.

NACSIS-CAT Union Catalogue Database (October 1990)

		Bibliography	Holdings
Books	Japanese	420,000	2,110,000
	Foreign	930,000	1,720,000
Serials	Japanese	57,000	1,176,000
	Foreign	107,000	874,000

Author Authority		402,000
Title Change Map	Japanese	5,856
Title Change Map	Foreign	12,804

1.3.4 Electronic Manuscripts

The Electronic Campus, Electronic Library, Electronic Book, Electronic Journal, and Electronic Publishing, all start from electronic manuscripts. Electronic manuscripts are produced by numerous authors for their individual purposes using diverse hardware/software environments with, at present, little exchangeability.

Word processing systems on personal computers in offices, campuses, and at home have been producing a mass of electronic manuscripts, most of which complete their once-only-mission to print on paper. However, conversion software for text files encoded by dumb word processing machines is a strong undercurrent in the PC market. This reflects the demand for exchanging word processing manuscripts including graphics in electronic form. Also, until now, the editing information for page layout, size of characters, etc. in a word processor file are not transferred to other word processing machines, so that the receivers have to re-edit the manuscripts.

Book and journal publishers accept manuscripts in a machine-readable form, which are then transformed by a conversion mechanism to computer type-setting data. Small printing firms have started to follow suit. Re-editing electronic manuscripts to reproduce the text as the author expects is not only labour-intensive but also intellectually demanding.

Technological incompatibilities of character sets and graphic information, physical and logical file structures, and layout and style information prohibit the free flow of electronic manuscripts even within the same language as well as within a single organization. Standards related to flexible disks have been established for physical and logical specifications.

A lack of social conventions also prohibits the exchange of information as commercial, academic or commonly shared products for the public domain. Traditional links are to be reformed by the introduction of electronic manuscripts among authors-editors-publishers-book traders and bookshops-readers and libraries as well as information distributors.

The process from the writing of a manuscript to its publication is not straightforward. For example, after the reading by referees, the authors are often required to re-write the text, or re-illustrate graphs and tables. Design of the layout may be carried out by a professional editor and/or the author.

2. Organizations promoting Electronic Publishing

2.1 Japan Electronic Publishing Association

Japan Electronic Publishing Association (JEPA), founded in September 1986, has promoted CD-ROM publishing. Its mission is to resolve the problems faced by those seeking to plan, edit and create electronic publications and all kinds of information media. Its goal is to contribute to the healthy development of the publishing and information industries. It has the following aims:

1. Collect and exchange information on the hardware and software industry in various foreign countries;
2. Promote business between members both in substance and in practice. Arrange exchanges between those involved and aim toward comprehensive research on projects at the same time;
3. Research appropriate charges related to electronic publishing;
4. Research copyright issues related to electronic publishing;
5. Research standards for hardware and software applications;
6. Research state-of-the-art technology related to electronic publishing and promote its popularization;
7. Carry out joint research to secure the necessary personnel for electronic publishing and develop employee training;
8. Research distribution organizations and routes for electronic publishing;
9. Carry out activities leading to good relationships and mutual improvement;
10. Undertaking activities to achieve the Association's goals.

JEPA is composed of corporate membership, and its membership has increased from 43 at the inception in 1986 to 55 at the end of 1986, 105 in 1987, 134 in 1988, 163 in 1989, to 171 in September 1990. Members include publishers, printing companies, newspapers, computer hardware manufacturers, software houses, and some abstracting and indexing businesses.

As early as 1987, JEPA started to develop a standard logic format for CD-ROM for the Japanese language that is compatible with ISO 9660:1988. In 1989 a test disk was developed with the co-operation of 22 member companies and seven CD-ROM press factories. JEPA developed a standard for multi-media data format in 1989 and a standard for CD-ROM documents (texts), voice, and images in 1990 under a grant awarded by the Database Promotion Centre (DPC).

The first standard CD-ROM (named "Wado Kaiho" after the very first coin used in Japan) has the following features:

1. Adaptation of ISO 9660: 1988 for the Japanese language. Consequently the Japanese language can be used for file names and the directory. Thus a multi-lingual file structure is achieved;
2. The test disk can be driven on a variety of personal computers such as NEC/ PC98, Fujitsu/FMR, IBM/AX, and Hitachi/B16, etc. to achieve a wider market;
3. Joint publishing of 22 software (data) is compiled on the test disk. "Comprehensive Database Directory of the Ministry of International Trade and Industry" is one of the test data. Joint publishing may reduce the cost of publishing;
4. A registration law for CD-ROM copyright, equivalent to the title page, the contents, and the colophons, is being proposed.

The activities of JEPA in its first four years concentrated on the development of CD-ROM for textual data. JEPA also aims to look at other forms of data such as voice, image and will extend its scope toward multi-media electronic publishing. It is important to secure distribution routes, and JEPA is apparently in a good position in this aspect, since major publishers, who are part of the traditional distribution system of printed media, are members.

2.2 Database Promotion Centre

Database Promotion Centre, Japan (DPC) was established in 1984 with a corporate membership of 126. DPC has been promoted by the government with the strong support of the commercial sector. Its activities for promoting database production and utilization consist of four areas:

1. Financial assistance for database production to help offset the high costs of production and the long period required to realize return on investment in databases deemed essential for the national economy;
2. Publication of "Database White Papers" since 1986 and "Database Directory" in printed version since 1983 as well as in a floppy disc version since 1987;
3. International activities such as holding conferences; overseas missions; participating in organizing conferences;
4. Survey, investigation and publication of manuals. Recommendations and reports have been made by the committees such as "Opening of Governmental Data to the Private Sector", "Promotion of Informatization of Rural Areas", "Advanced Utilization and the Promotion of Distribution of Statistical Data", "Establishment of Synthetic Networks for Databases", "Charge System and Regulations for Utilization of Databases", etc.

Financial support by DPC has two main purposes:

a) to promote the construction of databases with social, economical, international importance;

b) to activate R&D of database related activities;

Support has been awarded to the following numbers of projects:

1984	5
1985	18
1986	24
1987	29
1988	24
1989	20

Publishing activities of DPC, including "Database White Paper" and "Database Directory", are becoming popular and playing a leading role in business promotion. "Database in Japan 19XX" is an English summary of the annual white paper. In the 1990 edition, five problems confronting the Japanese database industry are pointed out:

1. Low independence as a business with low profit;
2. Structural immaturity of the industry;
3. Intensification and diversification of information content;
4. Technological gaps with the latest developments;
5. Lack of database specialists.

2.3 Japan Database Industry Association

Japan Database Industry Association (DINA) was founded in 1979 by 19 commercial companies with the aims of establishing the database industry in Japan and contributing to the business of its members. DINA plays a role as the voice of the industry. By the end of 1989 there were 109 corporate members. Activities are defined by its goals:

1. Promotion of databases;
2. Investigation into the promotion of the database service industry;
3. Recommendations to government administration on database service industry policies;
4. Seminars for the database service industry;
5. International exchanges for the database service industry;
6. Establishment of codes of business for the database service industry.

DINA runs more than ten committees including "Media Committee", "PC Communication Committee" and the "Database Regulations Committee". An activity of DINA that attracts the members of the Association and other professional people is a series of seminars such as the DINA Database Utilization Seminars.

The Database Fair has been held every year since 1989, jointly organized by DPC and DINA. Database '90, the second in the series, attracted 68 exhibitors, mostly Japanese vendors but some foreign, and an audience of 30,000 over three days.

2.4 SGML-Forum

The SGML Forum was created in May 1989 at the INSTAC with support of MITI. Members of the Forum are mostly mainframe computer manufacturers, software houses, and printing firms. The majority of the publishing firms are looking forward to the fruitful standardization of SGML.

The Forum is composed of a Planning Working Group, a Technical Working Group, and an Application Development Working Group. The Forum holds open seminars twice a year in Spring and Autumn, and attracts many participants.

2.5 Japan Information Centre of Science and Technology

The Japan Information Centre of Science and Technology (JICST) was founded in 1957 by the Japanese Government (Science and Technology Agency). Its mission is to collect, process and store national and international information in the field of science and technology for open public access. With ten branches, two deposit centres, and two overseas offices in Paris and Washington, D.C., JICST provides a comprehensive information service for science and technology.

The collection development of JICST is known to be comprehensive. It is planned to collect the following volumes of publications:

Foreign serials	8110
Japanese serials	7380
Conference proceedings	400
Technical reports	12500
Patents	47 types
Secondary publications	41
Data Files	10
Government publications	5000

Materials are collected from Japan (50.8%), USA (18.2%), UK (9.6%), West Germany (4.7%), Netherlands (2.6%), USSR (2.4%), France (1.9%) and Switzerland, Canada and East Germany.

JICST services include:

Information Retrieval Services

Online IR (JOIS and JOIS-F for factual databases);
STN International;
SDI;
RS (retrospective retrieval);
Magnetic Tapes.

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Publications

[Kagaku Gijutsu Bunken Sokuho] abstract journal in 12 parts by broad subject fields;
[Kaigai gijutsu Hi-Lite];
Joho Kanri (the leading journal of information documentation sciences).

Photo-copying

Materials collection
Contents sheet service
Translation
Literature survey
Reading room service

Conferences and meetings

Overseas access to the JICST databases is available through KDD/Venus-P and other network facilities including public telephone lines.

Databases are produced by JICST and there are a few non-bibliographic databases in JOIS-F services:

- DNA Databases;
- JICST/NRIM Materials Strength Database for Engineering Steels and Alloys;
- Chemical Dictionary;
- Thermophysical and Thermochemical Property Database;
- Mass Spectral Database;
- Crystal Structure Database;
- Chemical Substance Safety Regulation Database.

The last database, Safety Regulation, is a full text database and JICST will extend its services toward full text databases with its English-Japanese machine-translation facilities. JICST has led the development and implementation of machine-translation for its vast amount of databases for overseas access.

2.6 The National Centre for Science Information System

The National Centre for Science Information System (NACSIS), is one of the National inter-University Research Institutes, whose purpose is "to gather, organize and provide scholarly information, as well as to carry out research and development (R&D) of scholarly information and a science information system (SIS)," as defined by Article 7 of the National University Chartering Law. Mission rendered and R&D activities by NACSIS are as follows:

1. Planning and coordination of the Science Information System Programme for Japan;

2. R&D of scholarly information and a SIS to carry out the Programme;
3. Developing a union catalogue database of library materials, and efficiently providing information from it, as comprehensive university library collections are built up in Japan;
4. Services to provide secondary information such as bibliographic, numeric, and graphic types;
5. Promoting systematic database construction for the nation;
6. Education and training of personnel to provide nation-wide services using such an information system.

The SIS is a nation-wide, comprehensive information system with NACSIS as its nucleus, encompassing natural and social sciences and humanities. It links university libraries, computer centres, information processing centres, national university research institutions and the like under MESC, through computers and telecommunication networks, joining national, municipal, and private universities, and provides scholarly information requested by university researchers. In the future, the System will extend its links to include information systems in the private sector and also those overseas. Major functions and services of SIS are:

1. All-inclusive collection of, and search for, primary information on sciences from various journals throughout the world;
2. Construction of, and search services on, online catalogue databases universities and research institutions throughout the nation;
3. Construction of, and search services on, databases of various types such as numeric and graphic/image type, reflecting the latest research activities at universities and institutions;
4. R&D on specialized computer hardware and software, the methodology of information management and of database construction, and an electronic library for efficient dissemination of scholarly information;
5. Promotion of pioneering and creative information exchange among universities and research institutions of both the private and public sectors through connections with other information systems;
6. International dissemination of the achievements of Japanese researchers through links with foreign information networks.

NACSIS is constructing a nation-wide Science Information Network (SIN) as part of the SIS in order to circulate information among researchers. The SIN is a privately operated packet switched network employing high-speed digital circuits to interconnect packet switching nodes. The network has already been expanded to cover major research sites in the nation which are under the MESC. It is also interconnected with computing and information processing facilities located in universities and national research institutes. Most researchers at universities and national research institutes are eligible to send their research-related information through the network, as well as to exchange electronic mail with others.

The SIN, which was started in 1986, initiated an international connection to the USA in January 1989. The first objective of the international link is to offer the use of various databases owned by NACSIS to researchers in overseas countries. The second is to allow exchange of electronic mail. The first overseas node of the SIN was established in National Science Foundation (NSF), Washington, D.C., USA to allow the query of NACSIS databases from USA. The connection was extended to the Library of Congress during 1989. As the second step, the SIN was connected with the British Library (BL) in February 1990, and it is planned to be further connected with other scientific research networks in the United Kingdom. The NACSIS-MAIL will be further extended to continental Europe and other regions of the world in due course.

At NACSIS, Scientific Papers, a conventional full-text database of professional journals in Japan, is now in service with an expected annual increase of 300 articles. At present, images such as tables and graphs are stored on optical disk, retrieved by a reference code embedded in the database and sent out by conventional fax (G III).

Scientific Papers (PAPER) is a full-text database of the full text of papers and is currently composed of two series: PAPER 1 Electronics and PAPER 2 Chemistry. Image data in the full-text databases are stored separately as a laser image on laser disk and delivered to the user's facsimile machine.

Scientific Papers (PAPER)

PAPER 1	156 full text record 887 abstracts only records
PAPER 2	3419 full text records
PAPER 1	Electronics Institute of Electronics and Communication Engineering, Japan
PAPER 2	Chemistry The Society of Polymer Science, Japan Japan Society of Bioscience, Biotechnology Agrochemistry Pharmaceutical Society of Japan

NACSIS is experimenting with the application of SGML in collaboration with academic societies for:

1. Inputting articles directly into a machine-readable form by authors using word processing machines (WPs or PCs);
2. Editing these articles into a bulletin of the academic society;
3. Publishing the bulletin in a traditional printed form or as a CD-ROM for local access;
4. Loading onto a database to provide online access.

3. Actions Promoting Electronic Publishing

3.1 CD-ROM

CD-ROM, Compact Disk Read Only Memory, is a new product in the database industry. It includes 540 Mega bytes, or 5.4 million characters in one byte code, or 280,000 pages of 2,000 word A4 pages in English.

CD-ROM as a database has special features. It is handled independently of the central computer network, and other resources required to carry out an online network search. The update cycle is not the hours or days that are common for online databases, but months. It can be down-loaded, in contrast to the usual limitation to online usage. CD-ROMs are handled on a personal computer with accompanying software dependent on a particular personal computer. Therefore, users have to handle it with limited options, and when there is no matching personal computer to a CD-ROM, it becomes only a plastic disk.

The CD-ROM Directory of the World (Sekai CD-ROM Souran) is compiled in the Japanese language by Kyodo Keikaku Shuppan, Co. Ltd. and distributed by Kinokuniya since 1988. The latest edition of Vol.4 for 1990 includes 567 entries.

Number of Entries in Sekai CD-ROM Souran

	Japanese CD-ROM	New Title	Foreign CD-ROM	New Title	Total	New Title
1988 Vol.1	55	22	154	11	209	33
1989 Vol.2	77	26	211	7	288	33
1989 Vol.3	173	25	257	5	430	30
1990 Vol.4	273	9	294	-	567	9

The Directory estimates the world production of CD-ROMs in 1990 as follows:

World Products of CD-ROMs in 1990 (Sekai CD-ROM Souran)

Japan	300	18%
USA	1200	70%
Europe	150	9%
Other	50	3%
Total	*1700*	*100%*

Mr. Muramatsu Hiroshi, the Editor of the Directory, indicates that the CD-ROM market is shifting from the selected few, in which the volume of sales are small, to the mass market, with an emphasis on entertainment. The volume of sales in this market is unpredictable, but in the order of more than 10,000. CD-ROM hardware manufacturers expect market growth to be in the area of home/family use.

CD-ROM development in Japan is not slow. JEPA has been working on developing CD-ROM standards based on ISO standards. The following are examples to show the variety of CD-ROM, ranging from bibliographic to dictionary databases:

"J-BISC" is a CD-ROM version of the Japanese National Bibliography produced by the National Diet Library from the Japan MARC database that is also available in a magnetic version. It includes 500,000 records of bibliographic information on monographs published in Japan since 1980. There are about 550 subscribers and five types of personal computers can handle J-BISC.

"Koujien" is a dictionary of Japanese language published by Iwanami Shoten. The CD-ROM version covers the 3rd edition of Koujien and 200,000 entries of Japanese words can be searched. Figures and images are also included. "CD-WORD 8" is a dictionary of several languages (Japanese, English, French, German, Spanish, Italian, and Dutch) published by the Sansyu-sha.

NACSIS also produces a union list of periodicals on CD-ROM that includes 40,000 titles of journals in the Japanese language held by university libraries at about 633 locations. The number of holdings is one million. The date of the coverage is as of October 1985. Another CD-ROM of the union list of periodicals for Western languages is under preparation to be published in 1990.

At the moment, CD-ROMs produced in Japan conform to JIS character sets. This means they can only be accessed by personal computers that apply JIS. Standardization of hardware and software is required for the user to gain flexibility on a personal computer and CD drivers. Establishment of standard search procedures for beginners or professional users will be necessary. CD-ROM durability is also another aspect for the user to examine.

3.2 Full Text Databases

Full text databases, or electronic manuscripts, are the next generation of databases and have been the focus of much database research and development. These databases are being used to store legal information, newspaper articles, journal articles and the full text of literary works. Legal information has become established as one of the major areas of the information market in the USA.

The potential benefits of full text databases include quicker input by authors, more complete sets of information, direct sources for printing and publishing and direct sources for online access.

Methods of updating, retrieval, and other aspects of processing full text databases are quite different from bibliographic databases. For example, the full text of newspapers is required to be updated in a short time, and has little or no validation. In contrast, input to a monographic full text database is almost always once only and supposed to be complete so that validation takes laborious checking.

The strongest benefit of full text databases is to provide users with complete information. Conversely, bibliographic databases only provide a guide to the original documents - even if the record includes an abstract- and require the collection of original materials from libraries or data archives. Access methods to full text databases are provided either online or off-line on media such as CD-ROM. Here is an enhanced option for users to access complete information.

A variety of full text databases are already accessible online in Japan through JOIS, NACSIS-IR, NIKKEI, etc. Most of the IR software currently in operation is based on functions for retrieving bibliographic information, so it is expected that a new generation of IR software to accommodate the demands of full text database searchers will be developed.

Full text applications of patent information in Japan, a topic that will be discussed later in this paper, has been intensive, with variety of mechanisms and products being produced.

3.3 Standard Generalized Markup Language

World-wide exchange of digitized data will be supported by applying internationally standardized composition conventions. To this end, universal requirements of printing compositions should be sought at the international level. This paper introduces Japanese printing conventions that seem to have a special treatment of text, tabular matters, and many other issues in the print process.

Standard Generalized Markup Language (SGML: ISO 8879-1986) specifies a language for document representation. SGML can be used for publishing in its broadest definition, ranging from single medium conventional publishing to multi-media database publishing. SGML can also be used in office document processing when the benefits of human readability and interchange with publishing systems are required.

Professional journal articles are typical examples of databases that can be handled by SGML and provides direct merits of the application of this new technology. However, in the case of printing general materials, the whole printing system should be fully integrated according to the SGML concept to achieve its direct effectiveness. Thus, the early establishment of "DSSSL" (Document Style Semantics & Specification Language) as an ISO standard is expected by the printing industries. DSSL is a sister specification of SGML and functions to allocate text data into structured areas such as columns, pages, etc. However, real composition information is handed to the formatter that follows DSSSL processing. DSSSL aims at covering printing composition of all kinds and has many factors to be discussed at a practical level.

SGML tries to resolve the technical obstacles by separating the information of printing composition from the information contained in each document. ISO/IEC JTC1/SC 18 has been working on standardization of the separated information on printing composition.

4. Standardization

4.1 The Present Situation of Standardization for Electronic Publishing

There is a standard for the exchange of information for printing composition established by the Japan Federation of Printing Industries. It covers minimal requirements among CTS systems manufacturers in Japan and has about 200 rules for printing composition summarized from 400 to 500 rules applied to either computerized type setting or manual photo-type-setting. The standard provides exchange conventions for CTS data between different CTS machines. It is expected to be promoted among the printing industries in Japan.

There exists a JIS X4001-4004 "File Specification for Japanese Document Interchange" for word processing that covers the processing of lines, business graphs, and images in documents. It is unfortunate that the JIS X4001 family has not yet been fully promoted among word processors. It is planned to introduce an electronic means of patent application in Japan from October 1990 and a standard format of electronic application will conform to the JIS X4001 family for flexible disk format. The main stream of patent application in this project, however, will be online based on ODA (Office Document Architecture) that is also an international standard.

There are, however, some technical difficulties in processing full text data. One is the cost of labour intensive input. Authors will be required to prepare their manuscripts in computer processable form according to a standard electronic manuscript specification such as the Standard Generalized Markup Language (SGML: ISO 8879-1986). Manuscripts are now handwritten or prepared on a wordprocessor by the author, but this task will become the work of secretaries or input operators, or authors shall struggle with the new burden of conforming to input specifications at the keyboard. Thus, the distance in time will be shortened by the introduction of the electronic manuscript preparation for full text database construction and its online utilization by users.

Another technical difficulty is the processing of images such as tables, figures, graphs, photographs in an article or document. Full text itself, like bibliographic data, is a single string of characters. Images are two dimensional and are difficult to input, store, retrieve, display and print. Images may have colours or gradations from white to black and require a quality resolution. Thus, there are many technical factors to be overcome in full text databases. However, it is expected that the full text database will be a basic form of electronic information providing users with a complete original document.

A draft JIS (X4150) of Standard Generalized Markup Language (SGML) was under preparation by a committee organized by INSTAC during 1989/1990. The JIS-SGML will be a translation of ISO SGML (ISO 8879). Its application standard titled "Logical Description of Full text Database for Information Interchange" is also being drafted by a committee at the Electronic Industry Development Association (JEIDA) conforming to a specification of the Electronic Manuscript Project (EMP) of the American Association of Publishers (AAP) that was established as ANSI Z39.59-1988. Both JIS-SGML and its application standard (Draft JIS) will need to handle Japanese text in Sino-Japanese characters as well as in numerous scripts of foreign languages.

4.2 Standardization in the field of IT, Documentation, Library Services

4.2.1 ISO/IEC/JTC1

ISO/IEC Joint Technical Committee One (JTC1) superceded ISO/TC97 in 1987. The Japanese office of JTC1 is maintained mainly by the Information Standard Research Committee (ISRC) of the Information Processing Society of Japan (IPSJ) since 1961 under the Japanese Industrial Standard Committee (JISC). The JTC1 currently has over 600 work items to be standardized to which IPSJ assigns about 1,300 experts who are appointed on a voluntary basis from computer manufacturers, software houses and universities. Nearly one quarter of the budget is allocated for the publication and document reproduction for activities of the seventy working groups.

The scope of the JTC1/SC 18 is "Text and Office Systems" and that of WG 8 is concerned standardization for printing. The WG has been drafting a Standard Generalized Markup Language (SGML), Document Style Semantics and Specification Language (DSSL), etc.

4.2.2 ISO/TC46

Japan has been a P-member since 1970 to ISO/TC46 Information and Documentation of which the Secretariat is maintained by the DIN of German standardization organization. The Japanese national committee and working groups are being re-organized under JISC and JEIDA. The Japanese national committee was housed at the Information Science and Technology Association (INFOSTA) until 1988. JEIDA is now an action secretariat for Working Groups of the national committee of ISO/TC46. Most of the members are representatives from libraries or academic staff from universities. Participation from the private sector is small. The budget is nominal because of the weak organization of library services in Japan. Information industries are not yet fully represented on the national committee.

4.2.3 JIS and SIST

Four Japanese national standards were issued in April 1988 in the field of Information & Documentation. They are:

JISX0304-1988 Codes for the Representation of Names of Countries
JISX0305-1988 International Standard Book Numbering (ISBN)
JISX0306-1988 International Standard Serials Numbering (ISSN)
JISX0307-1988 Universal Decimal Classification (UDC)

During 1989/90, several JISs in the field were issued:

JISX0701 Terminology of Documentation (Basic Concepts)
JISX0702 Terminology of Documentation (Document)
JISX0705 Terminology of documentation (Collection, identification and analysis...)
JISX0706 Terminology of Documentation (Documentation language)
JISX0801 Abbreviation of Titles of Periodicals (SIST)5; ISO 4)
JISX0802 Description of Name of Corporate Body (SIST)6; ISO 833 (deleted)).

ISBN is translated from ISO 2108-1978 and ISSN from ISO 3297-1986. Maintenance agencies of these codes are required for updating, ISSN has been maintained by the National Diet Library since 1976 and ISBN by the Japan ISBN Administration Committee since 1981. There exists an ISO standard for Country Codes (ISO 3166-1981). However, there is no Japanese agency for maintaining country codes, thus, JIS X 0304 is categorized as a non-translation from ISO. The first three JISs were drafted under a committee organized by JEIDA who acts and promotes industrial coordination for standardization.

Draft JISs in the field of information and documentation are being prepared during 1990/91:

- Logical description of electronic manuscripts
- Thesaurus construction (monolingual: DIS 2788)
- Commands for interactive text searching (DIS 8777)

Standards for Information Science and Technology (SIST) are 20 years old. Japanese professional standards for library, abstracting and indexing and other information services are administered by the Agency for Science and Technology and published by JICST. There are 13 SISTs as of October 1989.

SIST01-1980: Abstracts and Abstracting
SIST02-1984: Description of Bibliographic References
SIST03-1980: Common Format for Bibliographic Information

Interchange on Magnetic Tape (Carrier)
SISTO4-1983: Implementation Format for Bibliographic Information

Interchange on Magnetic Tape
SISTO5-1981: Abbreviation of Titles of Periodicals
SISTO6-1981: Description of Name of Corporate Body
SISTO7-1985: Presentation of Periodicals
SISTO8-1986: Presentation of Scientific Papers
SISTO9-1987: Presentation of Scientific and Technical Reports
SIST10-1985: Data Description for Bibliographic Information
SIST11-1987: Data Assignment on Record Format for Numerical Information (draft)
SIST12-1988: Presentation of Preprints (draft)
SIST13-1989: Index and Indexing (draft)

The target field of SISTs is not only databases in the Japanese language but also any form of documents and their handling where Japanese (Sino-Japanese) scripts play a central role in the medium of information. The design principle of SIST is to conform as much as possible with international standards such as those set by the ISO, UNESCO/UNISIST, and IFLA, etc.

4.2.4 Kanji/Hanji/Han Character Code/Set

There are national standards of Kanji or Chinese character set/code in Korea, China, and Japan.

GB2312-1980 (China)
KS5619-1987 (Korea)
JIS XX0208-1983 (Japan)

All of them are in two bytes, ANSI Z39.64-1988, an American national standard of East Asian possible character set/code was established in 1988 and includes Chinese, Korean and Japanese scripts in three bytes.

ISO/IEC/JTC1/SC2 is in charge of standardizing character sets for information exchange. Currently DP/DIS 10646, a character set of the next generation, is the subject of strong debate between member countries.

ISO/TC46 also has interests in character sets for bibliographic purposes and established several international standards covering extensions of Latin alphabet character sets. DP/DIS 10646 has also been a subject within TC46 since 1989.

An International Conference on Scholarly Information Network was held in December 1987 by NACSIS concerning the character sets and codes among East Asian countries as well as North America and European countries. One of the outcomes of the conference was the understanding "not to have one universal East Asian character set" but set up one-to-one conversion tables between national standards of character set/code, such as between Chinese GB and JIS, between Korean KSC and JIS, and so on NACSIS started, in 1989, a three year international joint research on a feasibility study on "International Exchange of East Asian Databases" in collaboration with research institutions in Korea and China. A domestic cooperative feasibility study on "International Bibliographic Control in Japan" is also underway.

5. Concluding Remarks

Electronic publishing, with its variety of products and potential, is being developed in Japan as CD-ROMs, full text database, and printing on paper, etc. Developments with substantial investment will be needed in both the private and public sectors. Academic publishing is a part of the frontier of development. Developments will include:

Technical developments (standardization)
Input/Data capturing
Terminal/Workstation
Editing/Markup
Version control
Data quality control/Authority control
Delivery mechanisms
Resolution (reproduction) quality
Retrieval software

Social developments
Copyright
Conventions between Author/Editor/Printer/Publisher/Distributor/Reader
Charging mechanism and conventions
Training of editors and/or authors
Style manual

International developments (both technical and social)
Character sets
Common command language for full text, images
Style manual

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Opinions expressed in this paper do not necessarily represent those of institutions cited.

Recommendations and Resolutions Passed at the 11th General Assembly and Congress of FID/CAO

1. Considering the importance of information services to the social and economic development of member countries, the FID/CAO Assembly urges member states to:

   - Identify existing information policies that relate to information services in their countries with the view of coordinating and integrating them.
   - Evaluate national information policies of other nations which are being planned, implemented or are in operation with the view to applying them in their own country: For example, creation of special information services such as patents, information service for industry, etc.
   - Provide the necessary infrastructure (such as telecommunications, information technology, education, etc.) so that an effective information policy can be developed and implemented.
   - Request that their government take the lead to improve international cooperation so that the free flow of information between member countries is facilitated, eg. cooperative production of data bases, exchange of information, direct on-line services, standardization of data format and training of personnel.

2. FID/CAO General Assembly recommends that the FID/CAO/II Committee survey the formats used in databases, directories, etc. in the region and develop a standard format for the design of such databases.

3. FID/CAO General Assembly recommends that members support the FID/CAO/AG Committee by contributing articles for publication in the FID/CAO/AG Newsletter.

4. FID/CAO General Assembly recommends that the FID/CAO/AG Committee prepare a directory on AG activities in the region and distribute it to Member Countries.

5. The General Assembly wishes to record their deep appreciation to KIET for all the effort made in making the congress a success and also for the warm hospitality extended to all overseas delegates.

6. The General Assembly of FID/CAO requests FID Council to devote a greater proportion of membership dues to FID/CAO for regional activities.

List of National Delegates

Name	Country
Dr. Ian DICKSON (President FID/CAO)	Australia
Mr. Lawrence TAM (Secretary FID/CAO)	Australia
Mr. ZHANG Fenglou	China
Mr. CAO Zhouhua	China
Mr. Barry BURTON	Hong Kong
Mr. B. SUDARSONO	Indonesia
Mr. Jacob LEEV	Israel
Mr. Nagao HAGIYA	Japan
Mr. Chang Kyo LEE	Korea
Mr. Han-choi KANG	Korea
Dr. Oli MOHAMED	Malaysia
Ms. Margaret OBI	Papua New Guinea
Mrs. Nongpahanga CHITRAKORN	Thailand
Dr. Oleg SHATBERASHVILLE	U.S.S.R.